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Foreword

Dear Colleagues,

1st International Congress on Food Technology, which was organized by the Association of Food Technology and Akdeniz University with the contributions of the Ministry of Agriculture and Rural Affairs, was held on 3-6 November 2010, in Antalya, Turkey.

The primary objective of the international congresses is to bring together the scientist from all over the world to share their knowledge and experiences during the officials sessions; however such organizations also provide a valuable floor for the scientists to come together during the coffee breaks and meal times, at the poster areas, or during the opening and closure ceremonies to build bridges for future joint projects and establish new friendships. We have paid special attention to the selection of the Congress venue to give the participant such an opportunity.

I would like to present my thanks to all members of the Congress Organizing Committee, and I am especially grateful to Mrs. Birce M. TABAN, Mrs. Hilal B. D. HALKMAN, Mr. Hakan ERİNÇ and Mrs. Özlem E. SAĞDAŞ for their paramount efforts and friendly supports.

I also would like to take this opportunity to thank to the members of Scientific Committee for their valuable evaluations.

We appreciate unique supports of the Congress Sponsors, Marmara Babil as our official travel agency, Limak Atlantis Hotel Belek for warm hospitality and Boz reklam as our web site organizer.

The last but not the least, very special thanks to OrLab for the whole and precious support.

Best regards,

Prof. A. Kadir HALKMAN
Congress Chair

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ORAL PRESENTATIONS

O101

PROBIOTICS AND THE INTESTINAL MICROFLORA OVERTIME AND SPACE

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Human body has developed a holistic defense system, which mission is either to recognize and destroy the aggressive invaders or to evolve mechanisms permitting to minimize or restore the consequences of harmful actions. Within a few hours from birth the newborn develops its normal bacterial flora. Bacteria start to appear in feces within a few hours after birth. Colonization by Bifidobacterium occurs generally within 4 days of life. Bifidobacterium is reported to be a probiotic bacterium, exercising a beneficial effect on the intestinal flora. An antagonism has been reported between B. bifidum and C. perfringens in the intestine of newborns delivered by caesarean section. The aim of the probiotic approach is to repair the deficiencies in the gut flora and restore the protective effect. Various bacterial species used in fermentation of dairy products often colonize children in high numbers, specifically L. paracasei, L. delbrueckii lactis, L. lactis lactis, Leuconostoc. Bifidobacterium was also found sparsely in the children microbiota (10%), as well as in the elderly (5%). The decline in beneficial Bifidobacterium sp numbers is one of the most marked changes in the elderly gut. Moreover, Bifidobacterium species diversity observed in infants and adult's decreases as Bifidobacterium adolescentis and Bifidobacterium longum become most predominant. Reduced attachment of Bifidobacterium sp. to epithelial cells may be induced by the ageing process. Probiotic microorganisms are found in commercial fermented foods, in traditional foods.

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O102

THE USE OF ORANGE FIBER IN SUCUK PRODUCTION

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In the study, the effect of orange fiber on some properties of sucuk (Turkish dry fermented sausage) was investigated. Different levels of orange fiber (0 %, 2% and % 4) were added to sucuk batters containing different levels of fat (10%, 15%, 20%). Sucuk samples were subjected to physical, chemical and microbiological analysis during ripening. Orange fiber had very significant effects on lactic acid bacteria and Micrococcus/Staphylococcus counts. These counts were also very significantly affected by ripening time, too ($p<0.01$). In the presence of orange fiber, pH value of sucuk decreased. The lowest pH value was determined in samples containing 4% orange fiber. As ripening time progressed, pH value decreased. However, the interaction of fiber and ripening time was not significant on microbiological counts and pH value. Orange fiber decreased the amount of residual nitrite ($p<0.01$) and increased the TBARS value ($p<0.01$). Fiber usage also decreased the cooking loss ($p<0.01$). L* and b* values of sucuk samples showed an increase depending on the amount of fiber. As a consequence, it was determined that production of sucuk with functional properties by using orange fiber was possible.

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O103

LUPIN INCORPORATED NOVEL HEALTHY FOODS AS A SOLUTION TO OBESITY AND MALNUTRITION

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Obesity, diabetes and cardiovascular diseases are some of the biggest health challenges in the world especially in the developed countries. There are more than one billion adults overweight and at least 300 million of them are clinically obese. On the other side, malnutrition is common in many developing countries which causes high mortality among children. The unaffordable price of protein rich foods is one of the major reasons for malnutrition. Lupin, a grain legume, is high in protein (40%) and dietary fibre (30%) contents and contains a range of bioactive compounds. Independent clinical trials have shown that lupin has unique health benefits including protection against cancer, lowering cholesterol and blood glucose levels and reducing obesity and type-2 diabetes. Lupin is also a low cost source of good quality dietary proteins. Considering the unique nutritional value of lupin, a range of foods were developed containing 10-70% lupin. Lupin incorporation improved the nutritional quality of foods without deteriorating consumer acceptability. Pasta, instant noodles and biscuits containing 20% lupin flour were highly acceptable. Incorporating 20% lupin resulted in 20-25% increase in protein and 140-150% increase in dietary fibre contents. Crisps prepared by using 70% lupin flour had 28% protein and 22% dietary fibre.

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O104

FUNCTIONAL FOODS AND HEALTH BENEFITS

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In recent years, health claims on food became more tightly focused, shifting away from general functionality and nutritional benefit and towards very specific disease reduction claims.Functional foods are up to now mostly targeted towards the prevention of osteoporosis, cardiovascular diseases, increase of immune defenses, improvement of digestive health, and new areas like Alzhemier and joints .Functional food science is still at an early stage in this development. As knowledge about the functional effects of foods increase and the functionality of particular foods and food components is more extensively recognized technology will have a continuing role to play in making those components more widely available and accessible.

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O105

ISOLATION OF BIOACTIVE COMPOUNDS FROM USEFUL FOOD AND PHARMACEUTICAL MATRICES USING TWEEZING ADSORPTIVE BUBBLE SEPARATION (TABS)

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Tweezing-adsorptive bubble separation (TABS) was used as a method to enrich a variety of interesting proteinaceous substances from respective aqueous solutions. The method works by introducing gas into a liquid, so that foam is developed above which in turn contains the substances of interest. The foam when liquefied is highly enriched and ready for further use such as preparations for food and pharmaceutical products. The main characteristic of the method is that a chelator is especially synthesized in order to lock on to the substance of interest and to transfer it into the foam for achieving higher enrichment and recovery values. By using 2-(carbamoylmethyl-(carboxymethyl)amino) acetic acid (ADA) coupled with an octyl-part as chelator, metalloenzymes such as laccase C and horseradish peroxidase were enriched 13.3-fold (66.31% recovery) and 17.8-fold (85.34% recovery), respectively, without significant losses of enzymatic activity. The same was accomplished for 92-kD type IV gelatinase B (MMP9) and carboxypeptidase A, which were enriched 12-fold (87.3% recovery), and 18.82-fold (95.3% recovery), respectively. Other interesting substances such as the BSE infectious prion protein PrPSc, or α,β-unsaturated bovine insulin-(C12)n, selectively isolated in pure using bovine serum albumin as tweezer, as well as immunoglobulins G and M, were also investigated.

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O106

THE RHEOLOGICAL AND GELLING BEHAVIOR OF TILAPIA SURIMI WITH ADDED SAGO STARCH

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The rheological property of fish proteins from different species exhibit different rheological behaviors although some similarities do exist. Starch or biopolymers are known to influence the rheological properties of these proteins to varying degree and causing different elasticity characteristics. The rheological behavior of tilapia surimi in the presence of added sago starch has not been reported before, although reports on the other starches on surimi from different fish species are available. Native sago starch was added to the tilapia surimi in the range of 0 to 25%. The respective texture profile of the directly heated gel, kamaboko gel and the viscoelastic behavior of the mixtures were evaluated. The effects of the addition of the sago starch on the textural properties of directly heated gels and kamaboko gels were not similar. Hardness was observed to increase dramatically in kamaboko gels but to a lesser extend in the directly heated gels. Springiness, an important criteria for surimi-based product, was not strongly affected by the sago starch. The G' values of the mixtures were lowered by the addition of the starch and the lowest value was observed at 10% addition. Thus, indicating that a less stable structure was formed in the presence of sago starch. However, at 20 and 25% addition of the starch, increase in the peak temperature to greater than 90 ^{o}C was obtained.

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O107

PREPARATION AND CHARACTERISATION OF GELATINS FROM TWO SUDANESE EDIBLE INSECTS

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Gelatins extracted from two edible insects Aspongubus viduatus (melon bug) and Agonoscelis pubescens (Sorghum bug) were studied. The two insects showed 27.0 and 28.2% crude protein, respectively. Extraction of gelatin using hot water gave high yield followed by mild acid and distilled water extraction, respectively. SDS–PAGE patterns of the insect gelatins had very low molecular weight chains, and the two gelatins contained 40 kDa as main component, differential scanning calorimetry results confirm no difference between extraction methods concerning the extracted gelatin quality. FTIR spectra of melon and sorghum bug gelatines were similar and the absorption bands were situated in more than 6 bands in melon bug gelatin and only 6 bands in sorghum bug gelatin. Amide II bands of gelatins from both melon and sorghum bug appeared at around 1554 cm -1, while amide 1 bands (1734-1632 cm-1) appeared only in melon bug gelatins extracted using second and third methods. Microstructures of the insect gelatin examined with the scanning electron microscope showed that melon bug exhibited the finest gelatin network with very small voids. Melon bug gelatin showed finer structure with smaller protein strands and voids than sorghum bug gelatin.

Keywords: Aspongopus viduatus, Agonoscelis pubescens, gelatin, differential scanning calorimetry, Fourier Transform Infrared Spectroscopy, Sodium dodecyl sulphate gel electrophoresis

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O108

TECHNIQUES FOR DETECTION OF FOOD AROMA COMPOUNDS

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Food flavors are composed of different chemical compounds including nonvolatile taste active components and volatile aroma active molecules. However, aroma compounds which are relatively small in molecular mass are the predominant contributors to the peculiar flavor of a food. These are usually organic compounds such as acids, neutral compounds, sulfur and nitrogen compounds, alcohols, aldehydes, ketones, hydrocarbons, esters. During cooking, storage or consumption of foods, the aroma compounds are prone to chemical reactions that may change the sensory properties of the food product. Therefore, analysis or definition of food aroma systems becomes an important factor in improving the quality of food products during processing and storage. Three different techniques i.e. instrumental, sensory and combinations of the two, are used for detection or analysis of food aroma compounds. Instrumental methods consist of two main steps; the separation/ isolation of the aroma compounds by different sampling procedures such as distillation, solvent extraction, headspace sampling, solid phase microextraction etc. and the identification/quantification of these compounds by gas chromatographic methods, particularly by gas chromatography-mass spectrometry (GC-MS) and gas chromatography-olfactometry (GC-O), as well as electronic noses. This study reviews the latest researches and publications on the instrumental analysis of food aroma compounds.

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O109

HOW TO PREVENT FOODBORNE DISEASE

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Bacteria are by no means the only pathogenic foodborne microorganisms. Mycotoxin producing moulds, human enteric viruses, protozoan parasites and marine biotoxins also are of importance. Food safety nowadays starts with pre-harvest and harvest conditions, which is almost impossible in certain countries. In the post-harvest environment food safety becomes less commodity oriented, as the food moves through processing into the distribution and retail sectors. The microbial controls applied in the post-harvest environment are often designed to be (partly) lethal (pasteurization, sterilization) or may be intended to limit the growth of microorganisms. The latter often used with a combination of growth limiting factors (hurdle technology). Globalization of the world's food supply has contributed to changing patterns of food consumption and foodborne illness. Developing economies represent major sources of certain imports. For many of these countries, infectious diseases (diarrhea) still represent a significant burden of illness. From 1990, a number of methods have been described to detect foodborne pathogens, to decrease the microbial contamination of various food products. Numerous studies have been published on the effect of preservatives (i.e. bacteriocins) and new techniques (i.e. ultra high pressure) on foodborne pathogens and spoilage organisms, Moreover, an army of risk assessors tries to formulate Food Safety Objectives in order to reduce the burden of foodborne diseases. Do we have to continue in this way to improve food safety, or do we have to shift the helm?

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O110

MULTIMYCOTOXINS IN DRIED FIGS AND EFFECT OF ORIGIN ON MYCOTOXIN CONTAMINATION (THE MOULD SYMPHONY)

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The aim of this study is to provide information on mycotoxin contamination related to mould flora in figs during the drying stage. Samples collected from marketing stages do not always reflect the real contamination level. In this study fig samples were collected from 115 orchards for a period of 2 years from Turkey. Samples were investigated for mycotoxin such as aflatoxin (AF), cyclopiazonic acid (CPA), ochratoxin A (OTA) and fumonisin B1 (FB1) as well as mycotoxigenic moulds such as Aspergillus, Fusarium, Penicillium and related species. Mycotoxin analyses were carried out by high performance liquid chromatography (HPLC) after immunoaffinity cleanup and thin layer chromatography (TLC). Our four years study show that although varying from year to year, only 5% to 13% of the orchards/samples were contaminated with aflatoxin. Although avarage fumonisin B1 for the first year higher, fumonisin B1 frequency of the samples in the second year (79.6%) is higher than first year (71.8%). The OTA level for a majority of the samples was low, with only 4 samples containing OTA exceeding 1 μgkg-1. Cyclopiazonic acid is another common mycotoxin in dried figs.

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O111

ANTIMICROBIAL EFFECT OF SOUR POMEGRANATE SAUCE ON "KISIR", A TRADITIONAL APPETIZER

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The increasing demand for household natural sanitizers results in their extended utility. Sour pomegranate sauce is one of the natural sanitizers used to give flavor to food such as salads and appetizers. Although sour pomegranate sauce is supplied by large scale companies, it is also produced traditionally in small scales. The objective of this study is to investigate the antimicrobial effect of the traditional pomegranate sour sauce and commercial pomegranate sauce on "kısır" which is a traditional appetizer. Five different traditional pomegranate sour sauce samples produced in different regions in Turkey and two different commercial pomegranate sauce samples were analyzed to determine the inhibitory effect on the natural microflora of "kısır". The antimicrobial effects of the pomegranate samples were also determined on "kısır" which were spot inoculated with Staphylococcus aureus (ATCC-25923) and Escherichia coli O157:H7 (ATCC-43895). The results showed that both traditional and commercial pomegranate sauce samples caused antimicrobial effects on natural microflora and inoculated pathogens and it was found that inhibitory effect of all samples increased by application time.

Keywords: Sour pomegranate sauce, antimicrobial effect, Staphylococcus aureus, Escherichia coli O157:H7.

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O112

BIOETHANOL PRODUCTION POTENTIAL OF TURKEY AS AN ALTERNATIVE FUEL FROM AGRICULTURAL RESIDUES: A REVIEW

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Energy security and energy independency are vital components of economic stability and national security. The largest portion of the energy currently used in Turkey is derived from petroleum, 91% of which is imported. Besides depending on other countries' non-renewable energy source, petroleum consumption brings environmental problems as well. One fuel that has the potential to match the convenient features of petroleum is ethanol, produced from lignocellulosic biomass. The annual bioethanol potential of Turkey from major crop residues (wheat and barley straw; corn, cotton and sunflower stalks; sugar beet pulp) is estimated. Approximately, 18.4 Tg.year^{-1} of dry lignocellulosic biomass residue (excluding the amount to prevent soil erosion and animal feed) from these crops is available for conversion to bioethanol. Wheat and barley straw accounts for 58% and 19% of the total crop residue, respectively. This could produce up to 5.4 GL of bioethanol per year. The potential bioethanol production could replace 3.9 GL of gasoline per year when bioethanol is used in E85 fuel for a midsize passenger vehicle. The estimations suggest that bioethanol production from only wheat and barley straw can replace 96% of annual gasoline consumption in Turkey. Furthermore, Turkey can export approximately 0.77 GL gasoline equivalent of bioethanol per year. These findings indicate that Turkey has a huge potential to be an energy independent country.

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O113

FOOD SAFETY IN TURKEY IN THE PROCESS OF NEGOTIATIONS WITH THE EU

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Food safety is still a global public health concern. Every year millions of people suffer from foodborne diseases and governments take various actions and introduce new systems and requirements to ensure food safety and protect public health at highest possible level. In Turkey, the Ministry of Agriculture and Rural Affairs is the competent authority in the area of food safety. The Ministry is responsible for developing food safety policies and legislation, as well as the enforcement of food safety regulations. As a candidate country, Turkey is developing its food safety policies in alignment with the EU, considering the country specific problems. The Turkish food legislation is being harmonized with the EU since the adoption of Customs Union Decision in 1995. Following its recognition as a candidate country in 1999, Turkey gave pace to harmonization with the EU. In 2005 when accession negotiations were opened with Turkey, a new stage of the accession process has started. The negotiations with the EU relate to the adoption and implementation of the EU acquis, and are conducted under 35 chapters. One of these chapters is the Chapter 12- Food Safety, Veterinary and Phytosanitary Policy. Turkey now conducts all its harmonization work in the area of food safety within the scope of Chapter 12. The chapter covers detailed rules concerning food safety; mainly the hygiene rules for foodstuff production; the veterinary field, such as animal health, animal welfare and safety of food of animal origin in the internal market as well as the phytosanitary field covering issues such as quality of seed, plant protection material, harmful organisms and animal nutrition. Chapter 12 was opened to negotiation on 30 June 2010, during the Intergovernmental Conference that took place in Brussels. Many important steps are taken to open the Chapter for negotiation; however there are further actions to be taken during the upcoming period to establish systems fully harmonized with the EU.

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O114

TURKISH FOOD REGULATION

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It will be better to examine the Turkish Food Legislation within five periods since the establishment of the Republic: 01) Period from the establishment of the Republic to 1983; 02) Period from 1983 to 24-06-1995; 03) Decree No. 560 period from 24-06-1995 to 05-06-2004; 04) "Law on Adoption Of The Amended Decree By-Law On The Production, Consumption And Inspection of Food" No 5179 period starting with 05-06-2004; 05) "Veterinary Services, Phitosanitary, Food and Feed Law" No 5996 starting with 13-06-2010. "Veterinary Services, Phitosanitary, Food and Feed Law" No 5996 published in Official Gazette no. 27610 dated 13-06-2010 covers all phases of production, processing and distribution of food, food contact materials and supplies and feed, controls of residues of plant protection products and veterinary medicinal products and other residues and contaminants; fight against epidemic or contagious animal diseases, and harmful organisms, plants and plant products; welfare of farm and experimental animals with household and ornamental animals; zootechnic issues; veterinary health and plant protection products; veterinary and phitosanitary services; entry and exit procedures of live animals and their products; and official controls and sanctions related to all these issues. Provisions on official controls and laboratories will come into force on the date of publication of the law and other provisions will come into force on 13-12-2010. The law stipulates the publication of the necessary regulations within 18 months.

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O115

PROCESS-INDUCED FOOD CONTAMINANTS: PROGRESS IN MITIGATION AND CHALLENGES AHEAD

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The concept that heating food could introduce health risks is relatively new and also to some extent in contrast to the inherent notion that food is something nature given, sound and healthy. In this context, recent research has highlighted potential concerns due to compounds such as 3-MCPD (3-chloropropane-1,2-diol), furan and acrylamide. Several mitigation measures to reduce exposure to process chemicals have already been introduced by the food industry, and acrylamide is a good example. In this case the Confederation of Food and Drink Industries of the EU (CIAA), has developed the Acrylamide `Toolbox'', that is updated on a regular basis to reflect progress in mitigation. However, any measures if not adequately assessed could introduce potential new problems, such as the loss of protective effects (such as whole grain, antioxidants), or the concomitant formation of other unwanted and hazardous chemicals (known or unknown). Whilst there has been a considerable amount of research into the formation of process contaminants such as 3-MCPD and acrylamide in heat-processed foods, there are still significant gaps in the knowledge. In the case of 3-MCPD, a main point to clarify are the potential health risks (if any) from the intake of chloroesters *per se*, as well as the possibility of *in vivo* release of free 3-MCPD from the di- and monoesters. Hence, additional research into these compounds is warranted. The current lack of understanding of the health and nutritional impact of major changes to our diets in the medium to long term may in some cases be a greater risk than the presence of small amounts of process chemicals themselves. Thus, reliable mechanisms to assess risk/risk and risk/benefit are urgently needed.

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O116

MELANOIDINS RESEARCH IN FOOD: AN UPDATE

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Melanoidins are coloured and heterogeneous polymeric structures that are formed at the final stage of the Maillard reaction during thermal treatment of foods. Since decades, melanoidins have been included in the unspecific box of fiber. Recently scientific literature accumulates mountain evidences on their technological, nutritional, and physiological properties which a potential impact on consumer preferences and health. Thus, Melanoidins are not an inert material with slow gastrointestinal transit. In addition, daily intake of melanoidins is relevant in most of the worldwide dietary habits since melanoidins are widely distributed in most of the processed foods. Coffee and cereals products are the main contributors to the daily dietary intake of melanoidins. However, the lack of a reference material with a well characterized chemical structure is limiting the progress in this area although some advances will be discussed. This presentation aims to put in a context all this recent investigations in order to get a realistic picture of the situation.

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O117

EVALUATION OF PCR AND REAL-TIME PCR METHODS FOR RAPID DETECTION OF FOODBORNE PATHOGENS

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Since it is a challenge to detect and identify low numbers of known foodborne pathogens rapidly and accurately by cultural methods, for the last 15 years molecular genetic methods which are based on the PCR have been accepted as reliable for both rapidly determining the presence or absence and rapid identification of specific pathogens in food samples. Classical PCR methods rely upon the use of agarose gel electrophoresis for the visualization of the amplified target DNA fragments and further verification by sequencing or by hybridization of the amplified product with a DNA probe specific for the target fragment as the mean for endpoint analysis. Among the various PCR-based methods, real-time PCR methods which have ability to quantify the amount of template and allow the scientists to view the increase in the amount of template as it is amplified and so to eliminate the need for time-consuming post-PCR processing of PCR products, have gained significant acceptance because of their high sensitivity, specificity and rapidity in detection of foodborne pathogens for the last few years. Real-time PCR methods monitors the fluorescence emitted during the reaction as an indicator of amplicon production during each PCR cycle as opposed to the endpoint detection. These real-time PCR methods can employ either a target-specific oligonucleotide probe with a reporter dye found on the 5' end and a quencher dye found on the 3' end such as Hybridisation probes, TaqMan probes, hairpin structured-molecular beacons, and Scorpions or SYBR Green dye that binds to all double-stranded DNA and emits light when excited. There are also multiplex PCR methods, in which the multiple sequences are amplified simultaneously in a single reaction, using probes labeled with dyes that have unique emission spectra to expand the power of PCR analysis.

Keywords: Food, pathogen, polymerase chain reaction (PCR), Real-time PCR

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O118

ELIMINATION OF BACTERIA IN MILK BY PLASMA CORONA DISCHARGE TECHNOLOGY

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Milk's rich nutritional content makes it a cheap way of supplying human dietary requirements. Although raw, untreated milk is higher in nutritious value than treated milk, it is required due to it being a possible source for harmful bacteria, such as those that cause salmonellosis. Plasma is a promising new technology in many areas including food decontamination. The aim of our study was to test a novel plasma system that works at atmospheric pressure for its ability to eliminate test microorganisms dispersed in milk. Sterile milk was boiled in order to eliminate all bacterial growth. 6x107 of E. coli ATCC 25922, was inoculated into 15ml of the milk. Plasma was applied for 20 minutes and 10 μl of milk sample was removed and plated onto TSA at time intervals of 0, 3, 6, 9, 12, 15 and 20 mins. Following 24h incubation, the number of colony forming units (CFU's) was calculated Methodology was repeated for full fat, semi-skimmed and skimmed milk. Results showed a four fold reduction in the number of E. coli in milk. In conclusion, plasma corona discharge is a promising new tool for elimination of bacteria in milk.

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O119

QUALITATIVE DETECTION OF GENETICALLY MODIFIED ORGANISMS IN FOODS BY REAL TIME PCR

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Genetically modified organisms (GMOs) have been developed and commercialized in many countries for a variety of reasons including herbicide-tolerant and pest resistance, enhanced vitamin content and to prevent economical losses that diseases causing. In recent years worldwide production and the use of GMOs in foods is becoming more and more widespread. There had been a steady nine million hectare, increase in GM crop production over 2008, with 134 million hectares of GM being planted in 2009. In Turkey, cultivation of GMOs are not permitted and according to the Turkish regulation that was published in 2009, importation of GMOs are not permitted, to. The aim of this study was to determine of genetic modification in raw and processed foods that are sold commercially in Turkey. A total of 120 samples were collected from different markets and were examined for 35 S promoter, NOS terminator and 34 S promoter FMV to screen for the presence of transgenic material in samples using the Real Time PCR. The results of these examinations indicate that, 24 GMO positive samples were detected. GMOs positive samples were flour, soup mix, cornflakes, chocolate-flavored hazelnut spread, wafer, meat products, chocolate, maize products, tahini halvah and food supplement and they contained maize, soy and their products such as lecitin, maize syrup. These results demonstrate that the presence of GMOs in the Turkey market in 2009.

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O120

BIO-CONTROL OF SOME FOOD-BORNE PATHOGENIC BACTERIA BY BACTERIOPHAGE

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In recent years, researchers tended to bring new alternative to biological protective systems used in conservation of food and production of safe food. Use of bacteriophage against to pathogen bacteria in food was the most hopeful system in these methods about bio-control. Controls of bacteriophage for each pathogen species and subspecies and determination of phage-host originality are important because efficient bio-control was achieved. Researches concentrated on some food-borne pathogen bacteria such as Campylobacter, E. coli O157:H7, Listeria and Salmonella. In a consequence of these studies made as in vitro and in vivo, first commercial production of phage which will be used in foods was made in Netherlands. Also, it has been informed that use of phage is cost-efficient alternative as compared with other preservatives. In this review, it was discussed advantages and disadvantages about uses of bacteriophage by taking into account antimicrobial characteristics of them.

Keywords: Bacteriophage, Food-born pathogenic bacteria, Bio-control

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O121

CHEMICAL AND TOXICOLOGICAL RELEVANCE OF SUGAR DEGRADATION REACTIONS

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In heated sugar solutions, such as the food products glucose syrup or honey and the medicinal product peritoneal dialysis fluid (PDF), considerable sugar degradation can take place also in the absence of amines. As a consequence, different classes of compounds are generated. Among those, α-dicarbonyl compounds (αDCs) are of major interest, because they are formed in high concentrations and are of toxicological relevance. Therefore, a targeted screening was carried out to identify the major αDCs formed from glucose in heat sterilized PDFs and the structures of novel αDCs were identified. Thus, it was shown that glucose is first degraded to 3-deoxyglucosone, which undergoes epimerization to yield 3-deoxygalactose via the dehydration product 3,4-dideoxyglucosone-3-ene [1]. Additionally, oxidation of glucose gives rise to glucosone and C-C cleavage to glyoxal and methylglyoxal [2]. Parallel quantification of the six major αDCs can be achieved by HPLC/DAD/MSMS or UHPLC/DAD/MSMS. αDCs exert cytotoxic activity as well as glycating activity leading to a decline of protein function. Formation of αDCs can be largely inhibited by pH adjustment during sterilization. It can be assumed that similar processes take place during heat treatment of food products containing high glucose concentrations. [1] Frischmann M, Spitzer J, Fünfrocken M, Mittelmaier S, Deckert M, Fichert T, Pischetsrieder M (2009) Development and validation of an HPLC method to quantify 3,4-dideoxyglucosone-3-ene in peritoneal dialysis fluids. Biomed Chromatogr 23: 843 – 851. [2] Mittelmaier S, Fünfrocken M, Fenn D, Fichert T, Pischetsrieder M (2010) Identification and quantification of the glucose degradation product glucosone in peritoneal dialysis fluids by HPLC/DAD/MSMS. J Chromatogr B 878: 877 – 882.

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O122

NANOENCAPSULATION OF FOOD INGREDIENTS: FROM MACROMOLECULAR NANOSTRUCTURING TO SMART DELIVERY SYSTEMS

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Efficient delivery of food ingredients through product processing and storage, and their controlled release in the gastrointestinal tract is yet a major obstacle. Nano- and molecular- encapsulation provides exciting new opportunities in this field. Among the advantages of nano-encapsulation technologies are high dose loading with smaller volumes, rapid absorption of active substances, increased bioavailability, and improved compliance. The use of food grade biopolymers, such as starch, has been suggested as a technological solution. This carbohydrate forms molecular complexes, termed V-amylose, with numerous ligands. We suggested using it and aimed to develop and asses delivery vehicles for nutrients and bioactive compounds using starch V-complexes. The ability of these complexes to protect fatty acids from oxidation was first demonstrated with various molecules as ligands. The release of guest molecules is mostly due to digestion by pancreatic amylases. The slow release process suggests a possible use of these complexes for colonic delivery. The size of the complexes can be controlled by their formation method. A continuous dual feed homogenization process, combined with in-situ complexation, enabled the use of starches from various origins. This methodology yield sub-micron complexes that can then be used as natural nanocapsules for food applications. These nanocapsules are now being applied in staple foods, in the framework of the nanoFOODS project. In this lecture we will present the concept of nanoencapsulation and moleculer complexation. Then, the process of developing starch based. Molecular nano-complexes as the basis for molecular will be described. In addition, in vivo studies are ongoing to clarify the effect of complexation on the bioavailability. The results of these studies provide new insight of the effect of starch complexation with low molecular weight bioactives on their bioavailability.

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O123

HEALTH POTENTIAL OF BIOACTIVE ENCAPSULATED INGREDIENTS

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Bioactive foods contain nonessential biomolecules and exhibit the capacity to modulate one or more metabolic processes, which result in the promotion of better health and have beneficial effects on several diseases and target tissues. However, the preservation of bioactive food ingredients through product processing and storage, coupled with their controlled release in the gastrointestinal tract poses a considerable obstacle for the comprehensive exploitation of the health potential of many food bioactive components. Nanocapsule technology has been successfully used in drug delivery by the pharmaceutical industry for some time, but has remained unexploited by the food industry. The partners of Nanofoods project realized some new functional foods with the aim of testing the potentiality of encapsulation technology in food area. In this presentation the results obtained using pasta and bread products containing encapsulated curcumin, omega-3 and sylimarin will be illustrated. Data on bioavailability and on the modification of some biomarkers of lower gut and systemic functionality will be discussed.

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O124

EFFECTS OF NANOENCAPSULATED INGREDIENTS ON FOOD QUALITY

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The preservation of bioactive food ingredients through product processing and storage is yet a major obstacle for the full exploitation of the health potential of many food bioactive components. In this study, omega fatty acids and phenolic compounds encapsulated with high amylose corn starch were incorporated into bread and nut cream products, respectively. Sensorial and textural properties of the products incorporated with encapsulated ingredients were determined. The effects of nanoencapsulated ingredients on process derived chemical changes were also investigated in details. The results of bread making experiments revealed that flax seed oil appears as a viable alternative to fish oil as the source of omega fatty acids, allowing an enrichment in the bread formulation up to 5.0% without any adverse effects on texture and sensory properties as evidenced by headspace GC-MS analyses. Encapsulation of omega-3 fatty acids was found very effective in the protection of polyunsaturated fatty acids against thermal oxidation during baking process. Incorporation of nanoencapsulated ingredients helped reducing the process-derived contaminants by limiting the formation of acrylamide and hydroxymethylfurfural. The nanoencapsulated ingredients affected the rheological and textural properties of nut creams.

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O125

FOOD LEGISLATION APPROACH IN TURKEY

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Food Legislation is an important tool to ensure "food safety and consumer health protection", hence should be based on scientific evidence and food regulators shall ensure participation of all stakeholders in the legislative process. In Turkey; the food legislation evolved through several phases, as explained below. 1930's to 1995: Public Health Law: From 1930s to 1995, several Ministries and official bodies were in charge of enforcement of the food safety legislation and measures, which resulted in fragmentation of competence and reduced the effectiveness of the system. On the other hand, the legislation was in a more general nature and had some limitations. 1995 to 2004: Turkish Food Codex and By-Law On The Production, Consumption And Inspection of Food: During this period; Turkey issued more specific, and risk based food legislation compared to the previous years. Conflictions and overlaps of competence between related authorities were partly eliminated. An important development between Turkey and EU was experience during that period; in 1995, the Customs Union Decision was adopted. In the following years the legislation was adopted taking into account the EU rules and rules laid down by the Codex Alimentarius Commission. 2004 to 2010: Law on Adoption of the Amended Decree By-Law on The Production, Consumption and Inspection of Food. This period can be named as "EU Harmonisation Period". While publishing the food legislation, relevant EU text were taken into consideration. The Law No 5179 on Adoption of the Amended Decree By-Law on The Production, Consumption and Inspection of Food was published in 2004. However, this Law was not fully harmonised with relevant EU Legislation. Following the screening process on Chapter 12- Food Safety, Veterinary and Phytosanitary Policy, an opening benchmark was identified as "adoption of food, feed and veterinary framework legislation which complies with the EU acquis". For the fulfilment of this benchmark Law No.5996 on Veterinary Services, Plant Health, Food and Feed was adopted on 13 June 2010 and will enter into force on 13 December 2010. Nowadays Turkey is in a new period. Chapter 12 was opened to the negotiations. The secondary legislation will be published based on Law No 5996; it is anticipated to ensure full harmonization with this legislation. Effective implementation and enforcement will be the key issue for the upcoming period. It shall be given a great importance to assess the national needs and requirements and the requirements for the EU harmonization.

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O126

THE INTEGRATION OF TURKEY TO EFSA ACTIVITIES

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The European Union has experienced a series of food crises in the late 1990s. Following these crises which also weakened public confidence in the capacity of the public authorities to ensure food safety, the European Commission identified food safety as one of its top priorities and took serious steps to overcome the food safety problems thorough out the Community. In 2000, an action plan was adopted to establish a new food policy which is more proactive, coherent and transparent. A number of strategic priorities were identified. One of these priorities was to establish a European Food Safety Authority (EFSA). EFSA was set up in January 2002, as an independent source of scientific advice and communication on risks associated with the food chain. The main idea behind this was to conduct risk assessment independently from risk management. EFSA now produces scientific opinions and advice to provide a sound basis for European policies and legislation. The EU supports the Candidate Countries (CC) and Potential Candidate Countries (PCC) through various Community Programmes and Agencies to help them become familiar with EU policies and instruments, as well as to ensure co-operation in the pre-accession period. Within the scope of a Programme supported under the Instrument for Pre-Accession Assistance, EFSA is working with CCs, including Turkey, since the beginning of 2007 and PCCs since 2009 to promote the understanding of EFSA's work, share expertise and create information exchange mechanisms, and to ensure that the national authorities of the beneficiary countries can participate effectively in the activities of EFSA both prior to accession and following accession to the EU. The Programme comprises series of workshops, study visits and seminars in various areas of EFSA's remit. Furthermore, representatives from the beneficiary countries are given the opportunity to participate in specific EFSA meetings such as Advisory Forum meetings, Advisory Forum Communication Working Group, conferences, and scientific colloquiums. Turkey is participating in EFSA events and meetings since the beginning of 2007 and developing its capacity for development of a risk assessment system in Turkey. The Law on Veterinary Services, Plant Health, Food and Feed, which will enter into force on 13 December 2010, establishes the legal basis for risk assessment. Following the entry into force of the Law, Turkey will take necessary steps to develop a proper functioning risk assessment system.

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O127

ALLERGEN THRESHOLDS IN LEGISLATION - IS IT MAKING THE FOOD SAFER?

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Food Allergen legislation has been in place for several years now, not only in Europe but also in the United States, Canada, Australia/New Zealand, Japan and even South Africa. However, the only two countries which so far have introduced a threshold for labeling are Switzerland with 1000 mg/kg and Japan with 10 mg/kg. Are the Japanese consumer safer? What do the other European countries do? The European directives for allergen labeling only relate to allergens in ingredients. However, those are easy to catch if the paper documentation is sufficient. But the major problem are the hidden allergens, which enter the foods unintended but more importantly often unnoticed. What does industry do to protect the allergic consumer? How can the hidden allergens be detected? Would a threshold for labeling make sense? Is precautionary "may contain" labeling helpful? All these questions will be discussed in the presentation.

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O128

FOOD IRRADIATION TECHNOLOGY, LEGISLATION AND APPLICATION IN TURKEY

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Food irradiation technology is outstanding food preservation method, which can improve the microbial safety and quality of many foods. Food irradiation starts at 1920's but used effectively after 1980's. Today, in the world about 50 countries use this technology for food preservation: Disinfestations and disinfection. In 1999 ministry of Agriculture and Rural Affairs issued the food Irradiation Regulation in Turkey. This regulation based on 7 food groups and maximum treatment average dose accepted as 10 kGy's. These food groups are:1. Bulbs, roots and tuber, 2. Fresh fruits and vegetables, 3. Cereals, nuts, oil seeds, pulses, dried vegetables and fruits, 4. Raw or processed fish and frog legs, 5. Poultry meat, and red meat (fresh or frozen), 6. Dry vegetables, spices, herbs, condiments and vegetable teas, 7. Dry food of animal origin. In Turkey there are two multi purpose gamma irradiation facilities. One of them belongs to private sector (Gamma-Pak A.Ş) and the other one belongs to government (Turkish Atomic Energy Authority). Both facilities are licensed by local authority for food irradiation. Gamma-Pak also approved by EU commission. Turkey has 10 years experience on commercial food irradiation, and processing about 3500 metric tons yearly.

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O129

FOOD SAFETY ASPECTS OF FOOD COLOURS

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There has been considerable public attention to food colorants in recent years since the publication of the Southampton study in 2007, which concluded a link between cocktails of certain commonly-used artificial colours (Allura Red, Ponceau, Quinoline Yellow, Sunset Yellow, Tartrazine, and Azorubine/ Carmoisine) and hyperactivity in children. Since July 2010, products containing any of these colours, which have been linked to hyperactivity in children, have to carry a warning on packaging under European law.The EFSA lowered the ADI for three (Ponceau, Quinoline Yellow, Sunset Yellow) of the notorious six food colours in November 2009 but not for reasons associated with hyperactivity. The new ADIs were determined based on the toxicity levels observed in the animal studies, with a wide safety margin built in for humans.The EU and its member states have also taken action, including recalls of products containing Para Red, which is an azo dye that is similar to the Sudan dyes. Both Para Red and Sudan dyes are not permitted as food colours and their use in food is illegal. Sudan dyes have been classified as carcinogenic. A sudden increase of the occurrence of Para Red in spices that predominantly originate from the EU and Russia may indicate a recent trend towards dyes other than Sudan dyes. Several analytical methods have been developed for the determination of azo dyes. But they are all non-official methods. MoniQA EU Project focuses on validation of and setting performance criteria/requirements for methods used to analyse colorants as well as other contaminants in foods.

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O130

PHYSICOCHEMICAL, SENSORY AND FUNCTIONAL PROPERTIES OF WHEAT-DOUM FRUIT FLOUR COMPOSITE CAKES

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Preparation of cakes for those suffering from hypercholesterolemia with good flavour and general acceptability is an important demand. To achieve this goal, four cake recipes were prepared; using 0, 10, 20 and 30 % replacement levels of wheat flour by doum fruit flour (DFF). The chemical, physical, organoleptic characteristics and biological quality of the prepared cakes were studied. Results indicated that there was a gradual enhancement in water absorption and mixing tolerance index with increasing DFF in the cakes. The flavor and general acceptability of cake containing 10 and 20% DFF were significantly higher. The cakes were fed to rats alone or plus cholesterol powder and cholic acid for 42 day, growth and plasma total lipids were evaluated. The data showed higher food intake and lower gain in body weight in rats fed on the cake supplemented with DFF than for the hypercholestrolemic (HC) group. The plasma total cholesterol and LDL-cholesterol levels for animal groups which fed on cakes with DFF (10-30%) were significantly lower than the hypercholestrolemic (HC) group which fed on normal cake(0%DFF) ($P<0.05$). Highest plasma HDL was found in rats consuming diets based on cake containing 30% DFF. The atherosclerotic index showed progressive decrease with the increase of DFF level in the cakes. It can be concluded that DFF could be useful for preparation of cakes for those suffering from hypercholesterolemia.

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O131

PRODUCTION OF DIETARY FIBER FROM ORANGE ALBEDO AND USING IN MAYONNAISE AS MODEL FOOD

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Albedo is a white, spongy, cellulosic component, waste and high-fiber part of citrus fruits. Due to the presence of bioactive component, albedo is better quality than other dietary fibers. In this study, orange albedo fiber (OAF) was produced waste of orange albedo and its functional properties were determined. Different concentrations (3-5%) of OAF were used in mayonnaise as model food. Water holding capacity of OAF were determined as 5.2 mL water/g sample, oil holding capacity as 1.6 mL oil/g sample, crude fiber content as 75%, ash content as 3%, pH as 4.57, dry matter content as 80%. Color values of control mayonnaises and with OAF were between 69.93-69.53 for L, 1.40-3.67 for a, 9.05-15.94 for b value and dry matters changed from 23.31% to 21.30% respectively. The viscosity of the control mayonnaises and with OAF (3-5%) were observed as 2.94, 4.75, 7.02 Pa. s respectively, at the shear rate of 50 s^{-1}. As a result of this study, addition of OAF was increased yellowness, redness and viscosity of mayonnaises.

Keywords: Orange albedo, dietary food fiber, mayonnaise, viscosity

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O132

HOW CAN WE "HEALTH" YOU?

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Wherever we are, we are all care about healthy living. Innovative, high-quality and safe nutrients,combined with the consumer insights, market knowledge and application expertise, we can help your products attract more consumers. We are the only integrated premix ,vitamin and nutraceutical manufacturer capable of creating and delivering tailor-made formulations to you anywhere. Blend in our extensive scientific expertise, technical know-how, global presence and total quality assurance for your peace-of-mind. Via our global network of blend facilities we create value- adding nutrient combinations.Our Quali-Blends can you offer the right balance of ingredients custom-made for you. We can help you get to market faster with appealing health solutions that work.

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0133

APPLICATIONS OF BAKING TECHNOLOGY FOR DELIVERING HEALTH BENEFITS

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Since baking was invented some thousands of years ago in the Middle East, the manufacture of baked products and their consumption have spread around the world so that today there is nowhere in the world where they are not available or eaten. As baking has developed the range of products which are made has increased dramatically. Bread is seen as a staple food while cakes, cookies and pastries are seen more as luxury items. The contributions of bread and other baked products to the diet has long been appreciated and recognised. However, in modern societies the contribution of baked products to the well-being of consumers has been questioned with respect to specific ingredients and overall caloric values. This presentation will consider the challenges that our changing attitudes to health and diet pose to bakers by considering the role of recipe salt, fat and sugar. It will examine some of the pseudo-regulatory attitudes towards these ingredients, how baking technology can be used to deliver positive health contributions and how bakers may re-formulate or adjust their processes to continue to satisfy consumers.

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O134

EFFECTS OF PROCESS PARAMETERS AND ADDITION OF BREWER´S SPENT GRAIN ON THE PROPERTIES OF BARLEY-BASED EXTRUDATES

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Extrusion cooking is a technique by which foamy extrudates, e. g., snack products, can be produced. In this study extrudates were made during 3 separate trials by co-rotating twin-screw extruder using whole grain barley flour alone and with addition of brewer's spent grain (BSG; 10% of solids) and with addition of whey protein isolate (WPI; 20% of solids) and BSG (10% of solids) as powdery ingredients. Effects of extrusion process parameters (water content of the mass, screw speed and temperature profile) on the physical properties (expansion, water content and hardness) of extrudates were investigated using response surface methodology. Expansions of extrudates were small in all trials. The highest expansions were 88% in barley, 47% in barley-WPI-BSG and 27% in barley-BSG trial. Expansion increased when screw speed increased in all trials, and decreasing water content of the mass increased expansion in barley and in barley-WPI-BSG trial. Temperature profile affected expansion only in barley-WPI-BSG trial, where expansion increased with decreasing temperature. Extrudates were hard in all trials, smallest hardness being 70 N/mm in barley, 100 N/mm in barley-WPI-BSG and 202 N/mm in barley-BSG trial. Thus, BSG decreased expansion and increased hardness of barley-based extrudates which effect was smaller when WPI was added.

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O135

PREDICTION FOR DEGREES OF FUSARIUM MYCOTOXIN IN WHEAT USING EXCITATION -EMISSION MATRIX

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Fusarium mycotoxins are serious threats to human health. The objective of this study is to develop a nondestructive method for detecting mycotoxins using excitation-emission matrix (EEM). EEM is three dimensional data composed of excitation wavelengths, emission wavelengths and fluorescence intensities. It is acquired by measuring the fluorescence intensity of a sample at consecutive excitation and emission wavelengths. Three Fusarium mycotoxins (deoxynivalenol (DON), nivalenol (NIV), zearalenone1 (ZEA)) and four phase of diseased wheat were examined The EEM of the toxins showed some fluorescent peaks and counters. EEM of ZEA was quite different patterns from the others. Partial least squares (PLS) regression was applied to the EEM data of the wheat sample. Three mycotoxins in the diseased wheat had high correlations between chemical analysis value and EEM predicted value. It was showed that concentrations of the mycototins in the diseased wheat were estimated by PLS. These results indicated that EEM measurement can be applied to both qualitative and quantitative analysis of Fusarium mycotoxins.

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O136

TOWARDS A BETTER-NOURİSHED TURKEY

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Most Turks receive 45% of their daily energy needs from bread, meaning that bread is the basic nutritional staple in Turkey. To make that bread an even better source of nutrition, Doruk teamed up with TUBİTAK (Scientific & Technological Research Council Of Turkey) to create Turkye's first fortified flour. Research carried out by Doruk in collaboration with TUBİTAK analayzed the nutritional profile of the Turkish people and their basic mineral and vitamin needs. The results determined the contents of the flour used in Doruk's industrial bread facilitiy- UNO.

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O137

POTENTIAL APPLICATIONS OF NANOTECHNOLOGY IN FOOD PACKAGING

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Application of nanotechnology in food packaging is considered highly promising since this technology could improve safety and quality of food while reducing the use of valuable raw materials and the genaration of packaging waste. Nanotechnology provides improved material properties (mechanical, barrier, thermal and etc), shelf life extension via active packaging, monitoring product condition through intelligent packaging, and delivery and controlled release of neutraceuticals. Mechanical and oxidation stability, barrier properties and biodegradability of conventional polymeric materials could be enhanced by application of nanotechnology. Poor barrier and mechanical properties of edible and biodegradable films could be improved by using nanofillers so that the use of these materials in food industry could be expanded. The use of biodegradable nanocomposites will help to reduce packaging waste while extending shelf life of processed foods. The use of inorganic particles at nano scale also makes it possible to introduce multiple functionalities to help the delivery of fragile micronutrients within edible capsules. Bioactive packaging using bioactive compounds such as prebiotics, probiotics and encapsulated vitamins in the packaging material can be used to control oxidation, prevent off-flavor formation and undesirable texture of food. Bioactive compounds nanoencapsulated into the packaging are a promising approach due to controlled release of these compounds into the food product. Another potential application of nanotechnology in intelligent packaging is to use of nanosensors embedded in the packaging to monitor product condition, detect food spoilage and alert the consumer if food is spoiled. In conclusion, there are potential benefits of nanotechnology in food packaging but safety/toxicology issues, environmental impacts, economics and consumer acceptance will determine the success of this technology in food and packaging applications.

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O138

STUDY ON EFFECT OF PET PIECES AND STORAGE CONDITION ON FATTY ACIDS PROFILE AND SOME QUALITY INDEXES OF COMMON OILS IN IRAN

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This study is about effects of PET packaging and different storage conditions on chemical properties of three kinds of oil which are common in IRAN retail market. For this purpose three kind of oils include sunflower oil, canola oil, and Mix oil (contains; sunflower oil, soy bean oil, and cotton seed oil) was obtained from one of producer factory in tin plate packaging. Fatty acid profile and chemical properties such as; peroxide index, free fatty acids, iodine value, and induction period, color, were studied (before and after introducing of PET pieces and without this pieces) in two period 20 and 60 days storage in two temperature 25 and 45 degree centigrade. Results showed that storage period length, temperature of storage, and presence of PET pieces have significant effect on quality indexes, in such a manner that presence of pieces, and temperature of 45 degree centigrade, and 60 days storage period, causes increasing of peroxide index, and decreasing induction period of oils, and increasing free fatty acids, in comparison with related standards of mentioned oils, loses consume ability. A little change in iodine value was observed. No significant differences were observed in color index. Some changes were observed in fatty acids profile in effect of passing time, and increasing temperature, in such a manner that this two agent causes increasing values of saturated fatty acid and mono unsaturated and decreasing of poly unsaturated fatty acids. Our finding showed that storage of oils in low temperature (lower than 30 degree centigrade) is necessary and storage above than 25 degree centigrade will decrease the shelf life of product.

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O139

NEW TRENDS GLOBALLY AND IN TURKEY IN PACKAGING INDUSTRY FROM THE POINT OF FOOD PACKAGING

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According to World Packaging Organization 70 % of the packaging turnover goes to consumer sector and 30% to industrial sector. Another parameter pointing to the fact that 2/3 of the packaging are produced for the food industry increases the importance of food packaging. From one side improvements and changes in economical factors but as well as changes in social-economical attitudes of consumers, on the other side continuously increasing difficulties in global markets, but also increasing difficulties because increasing world population and need to feed more mouths but limitations in natural resources the importance of food Packaging is getting more and more than ever. In order to compensate the more and more increasing demand , in Turkey but as well as globally the task of acquiring more qualitative improvements with a close collaboration of packaging and food industry gains the highest priority. On one hand the factors related to content and ingredients and on the other hand migration of the unwanted substances in to the packaged food gets importance from the aspect of human health , but at the same time new improvements in material and form of the packaging but also in handling of packaging in supply chain are appear every time.

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O140

ASEPTIC PACKAGING

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Aseptic packaging can be defined as the filling of a commercially sterile product into a sterile container under aseptic conditions and hermetically sealing the containers so that reinfection is prevented. The task of the aseptic packaging operation is to: 1. Maintain the high microbiological quality of the product for the length of its intended shelf life and 2. Retain consumer acceptance with regard to flavour, texture and nutritional value of the product during the promised shelf life. To develop a successful aseptic packaging system, a number of critical factors of the aseptic packaging technique must be considered. Product formulations, microbial and enzymatic activity, storage conditions, package design, packaging materials and, where applicable, headspace and chemicals. TetraPak, utilises an aseptic form-fill and seal technique. This technique is the best and most successful technology. Presentation that will be held in this Food Congress will reflect the essence of Aseptic Filling Technology in general and Aseptic Packaging in particular.

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O141

DENSE PHASE CARBON DIOXIDE: NON-THERMAL PROCESSING OF BEVERAGES

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Dense phase carbon dioxide (DPCD) is the application of pressurized carbon dioxide to liquid foods in static, semi-static, or continuous systems. It is a non-thermal method to pasteurize liquid foods such as juices and beverages at temperatures around 40 C. The mild temperatures and pressures, and lack of oxygen preserve nutrients, flavors and other quality attributes. DPCD reduces microbial numbers, mostly those of vegetative cells, and inactivates some enzymes. Solubility of carbon dioxide in the aqueous portion of the liquid is essential for microbial inactivation. Methods of experimentally determining solubility, as well as predicting it using thermodynamic models are briefly discussed. Brief examples of applications to several fruit juices and other beverages are given. Approaches to the determination of the kinetics of microbial reduction are mentioned, with some examples. Patents in this area are briefly mentioned. The potential for commercial applications, with possible advantages as well as difficulties are discussed.

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O142

RESPIRATION RATE OF RED DELICIOUS APPLES UNDER AEROBIC CONDITIONS. INFLUENCE OF STORAGE TEMPERATURE

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The reliable measurement of respiration rate of fresh produce is the underlying aspect in designing a good and accurate modified atmosphere packaging (MAP) system. Nevertheless, respiration rate is dependent on factors like temperature and gas composition of the storage atmosphere, so it is of great importance to find a mathematical approach to predict respiration rate under given conditions. In this work, mathematical models based on regression analysis and enzyme kinetics were developed using respiration data generated at different storage temperatures for Red Delicious apples using the closed system method. In the enzyme kinetic based model, dependence of respiration rate on O_2 and CO_2 was found to follow the uncompetitive inhibition mechanism. Due to the stiffness of this model to incorporate the temperature term, the parameters obtained for fresh whole apple were then correlated using the Arrhenius equation. Both models were validated at 10 °C. Respiration rate of apple predicted by these models were in good agreement with experimental results.

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0143

USE OF JERUSALEM ARTICHOKE AS A POTATO SUBSTITUTE IN CHIPS PRODUCTS

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Jerusalem artichoke, a potato like vegetable, has been cultivated in various regions without any special breeding technique. Jerusalem artichoke tubers store inulin as a storage form of carbon unlike most plants in which starch is the storage form. Consumption of Jerusalem artichoke as a part of human diet has been received attention of researchers due to its health-promoting effects and potential value-added properties. Hence, the usage of Jerusalem artichoke as a substituter of potato in food industry could be a potential choice serving this purpose and increase its economical value. For this reason, chips produced from Jerusalem artichoke were compared with potato chips in the scope of properties including moisture-content, color, and texture. Moisture-content of chips slices was determined after frying process. Color is another quality parameter measured by a color reader. L* and b* values of Jerusalem artichoke samples were found to be lower, but a* values were higher than potato chips. Hardness and fracturability of fried Jerusalem artichoke slices were measured for the assessment of chips texture which has an influence on consumer demand. Hardness and fracturability of chips were found to be low compared to potato chips, as both products were fried at 190 °C for 4 min.

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O144

FRUIT-'FULL' TURKEY

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Turkey is a country with very wide agricultural areas where various vegetables, fruits and industrial plants are grown. One can find regions on the coast close to the sea, inland where tough continental climate is predominant, high plateaus or vast valleys; all with different and characteristic climatic conditions and some with very special micro-climates. Growers have excellent natural conditions to grow a wide variety of fruits in different parts of the country and harvest them at different periods of time. This has lead to many investments in fruit juice industry to be able to process existing fruits, and also to be able to supply product to the tremendous domestic consumption increase and compete in the juice market worldwide. Let us take a closer look at the growing fruit juice industry of Turkey, with very modern, up to date investments made lately.

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O145

YOGURT FORTIFICATION WITH PREDIGESTED, GERMINATED WHOLE SOYBEAN POWDER FOR ENHANCED THERAPEUTIC BENEFITS

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During the past decade, there has been an increased interest in nutrition and food science concerning biologically active compounds to promote health. There is an increased awareness of the health benefits associated with soybean as well as yogurt consumption. These health benefits have been primarily attributed to bioactive compounds in soybeans known as isoflavones; probiotic organism and bioactive peptides in yogurt. Research has shown that isoflavones are more prominent in fermented soy products. Furthermore, germination of soybeans closely resembles fermentation such that enzymes inherent in the soybeans can hydrolyze the non-bioavailable compounds into their bioactive form, and further fermentation (i.e. in yogurt manufacture) may further increase their yield. Our hypothesis is that incorporation of pre-digested germinated soybean powder into cow milk yogurt will produce increased yield of biologically active compounds in the yogurt blends to better meet recommended requirements for added health claims. We will present our patented process of producing pre-digested and germination soy powders, and the isoflavone profiles of these powders. Development and properties of cow's milk yogurt fortified with predigested, non-germinated and germinated whole soy powders will also be presented.

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O146

EXTENDED SHELF LIFE (ESL) MILK - VALUABLE DAIRY PRODUCT OR MILK WITH EXCESSIVE HEAT LOAD?

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The recent trend towards a longer keeping ability of pasteurized milk, without the negative flavour change normally associated with ultra-high-temperature (UHT) treatment, has resulted in the development of extended shelf life (ESL) milk. As heating causes a significant loss of organoleptic and nutritional quality, different time temperature integrators have been used to evaluate the heat load of ESL milk products. The objective of this study was to improve RP-HPLC methods for the analysis of furosine and native ß-lactoglobulin soluble at pH 4.6 in liquid milk using a Symmetry® 300 column (Waters). Native polyacrylamide gel electrophoresis and SDS-PAGE were also used to assess the impact of a thermal process on milk, and to distinguish different categories of heat-treated liquid milk samples. The established RP-HPLC method enabled the separation of whey proteins within 21 minutes and was used for quantitative determination of acid-soluble ß-lactoglobulin. Furosine was analyzed by ion-pair chromatography RP-HPLC within 8 minutes. Approximately 55% of ESL milk samples had a surprisingly low amount of native, non-denatured ß-lactoglobulin (< 500 mg/L) and a high furosine content (> 40 mg/100g protein), which was almost comparable to the excessive heat-load of UHT milk. Thus, electrophoresis of whey proteins and HPLC of furosine and native, non-denatured ß-lactoglobulin offer fast and reliable tools to evaluate and control the heat load of milk samples to minimize the loss of nutritional quality of milk with extended shelf life.

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O147

MANUFACTURING OF KAZAKH NATIONAL DAIRY PRODUCTS

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For many times Kazakh people produce wide variable dairy products from cow, sheep, goat, horse and camel milk. The purpose of this scientific work is manufacturing of new Kazakh national and functional products on the basis of traditional technologies. The basic scientific results of the scientific work are reduced to the following: 1. Cow, sheep, goat milk and colostrums qualities through regions of RK was studied. 2. Acidic, acidic-rennet, thermo-calcium coagulation regularities of Kazakh National Dairy Products (KNDP) with determination of rheological characteristics of clots while making KNDP were exposed for the first time. 3. Functional milk products on KNDP basis fortified with vegetable, fruit, non-traditional vegetable additions, grain, leguminous and groats cultures, new bacterial compositions based on studying their functional features were created. 4. Usage of condensing milk, usage of modern membrane methods of getting UF- and ED-concentrates from secondary dairy row material were based. 5. Results of the scientific research were realized in approved CT of RK to suzbe, sary irimshik, kurt, zhent, bal-kaimak, curd products, sauerkraut dairy products; they were inculcated on dairy plants of RK with a considerable economic effect.

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O148

WORLD AND TURKISH DAIRY INDUSTRY; TODAY AND FUTURE PROSPECTS

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Milk and milk products, being fundamental food items for our population, occupy an important place in our lives. Taking into consideration the fact that 15% of Turkish food and beverage industry operates in milk and milk products sector, the value added of the sector to the economy is undeniable. A general overview of Turkish dairy shows; a) Milk volume per animal is still half of the volume produced in developed countries. b) The number of dairy businesses is too high and they are dispersed. c) The number of animals per business is very low, therefore, most are not capable of manufacturing milk economically and towards the market. Hence, difficulties in the production of quality milk still exist. Diseases harmful to human health still exist, the negative economic effects (i.e. animal and production losses) of these diseases remain unchanged. In the world, on the other hand, due to the growing demand, global inventories have started to decrease. Raw material prices increase due to the fact that grains used in feed production are now used in the production of biofuel. Global warming deteriorate pasture lands causing a decrease in milk production especially in the European Union. The adaptation studies of Turkish food law and regulations to the EU laws and regulations will certainly have a positive effect in the future on our sector, however, fighting the difficulties of the globalization will be a challenge.

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O149

MEAT, MICROBIOLOGY AND THE CONSUMER; RECENT DEVELOPMENTS

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The meat industry in most European countries faces major challenges in meeting (sometimes contradictory) consumer requirements. First, meat safety continues to be an important issue because of loss of consumer expertise in safe handling procedures, and increasing pressure from authorities and retail chains. Second, demographic changes lead to the reduction of the size of households and as a consequence, to an increasing demand for convenience food with extended shelf life while, at the same time, consumers like their food to be as natural as possible, without food additives. Third, the ageing of the population in most industrialized countries lead to an increased interest in healthy food. Last but not least, there is increased awareness about environmental and animal welfare problems. The present paper focuses on possible alternatives to the use of nitrite in meat processing, on the impact of organic production and processing methods on the quality and safety of meat and meat products, and on prospects of and limitations to the development of fermented meat products with added health value.

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O150

THE USE OF NATURAL ANTIOXIDANTS IN MEAT AND MEAT PRODUCTS

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Antioxidants are a means of minimizing lipid oxidation. Antioxidants can act as metal chelators and free radical or oxygen scavengers which can slow the progression of lipid oxidation. Lipid oxidation can have negative effects on the quality of meat and meat products causing changes in sensory attributes (color, texture, odor and flavor) and nutritional quality. Several synthetic antioxidants have been used to successfully prevent lipid oxidation in the meat industry, but consumers are concerned about the health risks related to consumption of some synthetic antioxidants. Therefore, there has been a growing interest in natural antioxidants. Compounds obtained from natural sources such as grains, oilseeds, spices, fruit and vegetables have been investigated to decrease the lipid oxidation. The aim of this review to evaluate the effects of natural antioxidants that are widely used in meat and meat products.

Keywords: Natural antioxidants, lipid oxidation, meat and meat products.

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O151

STRATEGIES OF IMPROVING HEALTHIER MEAT PRODUCTS

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Meat and meat products are important sources of proteins, vitamins and minerals, but they also contain fat, saturated fatty acids, cholesterol, salt, etc. In recent years, many consumers have limited their dietary intake of fat and calories due to diet and health concerns, limitations in fat and cholesterol are important steps to prevent obesity and hypercholesterolemia, cardiovascular diseases and some cancer types. Since it is generally recognized that meat and meat products make an important contribution to diet, numerous efforts have been made to optimize their composition in order to help consumers adapt their diet to nutrient intake goals. Sensory and nutritional aspects, consumer preferences, cost, regulation, marketing, convenience and ethics have been widely crucial for the designing reformulated meat products. For developing healthier meat and meat products useful strategies are; modification of carcass composition, manipulation of meat raw materials, changing processing procedures and reformulation of meat products. Since reducing dietary fat is a major goal for many consumers there are various aspects of interest relating to product design and fat reducing strategy. Utilization of functional ingredients is one the attempt to develop functional meat products. Such ingredients include vegetable proteins, fruit and vegetable fibers and herbs. Meat based bioctive compounds, prebiotics and probitics can also be used in meat products formulations.

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O152

TURKEY AND WORLD MEAT OUTLOOK; CURRENT SITUATION AND PROSPECTS

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Turkish food processing industry has developed fastly in the recent years and there is currently a high volume of food products adequate for domestic consumption as well as for exports. The capacity usage compared to other developed countries is considerable high and is in average about 70%. According to the data in December 2009, meat and meat products sub-sector has the highest capacity with an amount of 77.9%. But Turkish meat sector has a low presence in world market. Due to negligible exports and imports, Turkish meat sector is shaped according to the domestic demand. However, as a result of integration with EU markets and with other international markets, the meat sector also has to reshape according to international standards. The production costs and prices are above world averages. In meat sector, per capita outturns are low with accompanying high unit prices. Animal diseases, insufficient inspections, unrecorded productions, high prices of raw material and finished products, small production units, incentives according to small production companies and late decisions in support policies are obstacles fort he growth of the Turkish meat sector. For the Turkish meat industry to compete in the world markets, continuous and standards supply of raw materials, with low costs is necessary. However, energy with average world prices is a necessity for competition. Finance and qualified personnel is not an obstacle for the growth of the sector. However, getting a market share in a highly competitive world market will be a challenge for the industry.

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O153

CONTROL OF THE DEGRADATION OF FRYING FATS DURING USAGE

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During usage, frying oils undergo deterioration by various chemical reactions. One of the effects is the formation of so-called total material (TPM). TPM is one of the indicators for monitoring the oil quality. Official methods for determining TPM are based on preparative column chromatography. The oil is separated into two fractions in a column containing silicagel. The eluent is a mixture of diethyl ether and petroleum ether. A second method uses plastics pipette tips instead of glass columns and the eluent is a mixture of isooctane and diisopropyl ether. These techniques use dangerous chemicals and need to be carried out in a laboratory by trained personnel. Particularly the first one has a high consumption of chemicals. It takes several hours until a result is obtained. Measures cannot be taken on the spot and only on the next day at the earliest. An alternative to these time-consuming chromatographic techniques is the measurement of the dielectricity number of the oil which increases with the concentration of TPM. This allows immediate consequences after some minutes and where the sample is taken. The dielectricity method yields results very similar to the chromatographic techniques. It is therefore a very attractive alternative method.

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O154

PARAMETERS AFFECTING THE ENZYME-ASSISTED EXTRACTION OF VEGETABLE OILS

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Enzyme digestion significantly improves oil recovery during the extraction process. Lower capital investment, lower time and energy consumption and increased oil quality are among the advantages associated with such kind of enzyme application. Appropriate selection of enzymes and optimization of extraction conditions make it possible to improve the oil recovery from plant tissues. Enzyme/substrate (E/S) ratio, pH and the concentration of enzyme solution, incubation time and temperature, moisture content, meal/water ratio, shaking velocity and particle diameter are among the parameters that need to be considered. Amylase, glucanase, protease, pectinase, cellulytic and hemicellulolytic enzymes have been used mainly to enhance the extractability of oil from oilseeds. A temperature range of 30-45°C, a moisture content of 30-40%, E/S ratio of 0.25-1.5% are among the best conditions considered to maximize extraction yield of oil in most enzyme-assisted extractions. Enzyme-assisted extraction can result in the oil recovery of up to 98% and a good quality protein meal. Enzyme-assisted extraction is a promising technology for broad industrial applications.

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O155

USAGE OF DIETARY NANO FIBERS IN FOOD EMULSIONS

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Most foods in our diet either are emulsions or have been emulsified during their production. Food emulsions now have an important place in human diet, so their physical, chemical and nutritional properties are now heavily being studied and their structures have been being well understood. Besides, dietary fiber containing food products whose health benefits are scientifically approved, have been taking more place in the markets. Also, researches are widely being done on increasing dietary fiber in food products. Following all these trends, it will be inevitable that dietary fibers are going to be ingredients of food emulsions. Hence, food emulsions will carry health claims and have more places in our diets. In this review, general properties and production bases of food emulsions are explained and the effects of dietary fibers on physical and stability properties of food emulsions are defined. The researches revealed that dietary fiber addition into food emulsions is improving textural properties of the emulsions and extending their stabilities during storage.

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O156

TURKISH MARGARINE INDUSTRY: FROM PAST TO PRESENT

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MUMSAD was established in 2004. Unilever, Ulker, Marsan, Turyag, Kucukbay cover 90% of Turkey's margarine market as members of MUMSAD. Uniting industry members under a roof and improving the industry is one of the main duty of MUMSAD. Total margarine & fats production in Turkey is 517 TT (147 TT table margarine, 36 TT vegetable ghee, 98 TT bakery margarine, 236 TT shortenings). Total market value is appr. 2 billion dollars and oils&fats&margarines per capita/annum consumption is around 20 kg. In the beginning of 2008, MUMSAD had started to arrange campaigns due to the beliefs that margarines cause high level of cholesterol, include TFA and are made of animal fats which contain high SAFA. Due to these unfounded rumors, margarine consumption had been decreased year by year. MUMSAD has been working on these three main issues to give margarines reputation back. During these works, meetings have been holding with medical doctors in order to win their trust, influential masses have been informing via media and public were informed by advertising campaigns. After the first one, post-campaign research was done and positive results were taken. For example; Margarine is a good fat is up 17%, Margarine does not contain cholesterol is up 13%, Margarine is a good source of energy is up 19%, Margarine contributes to nutrition diversity is up 19%. As MUMSAD we aware that it is an endless prosess and we have been working to do our best.

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O157

CONCENTRATION OF AROMA AND VITAMIN RICH FRUIT JUICES BY COMPLEX MEMBRANE TECHNOLOGY

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The fruits are rich in vitamins, anthocyanins, antioxidants, organic acids and flavonoids which have a positive effect to the human health. On the other hand, membrane separation processes are "cold" preserving processes, where the concentration of aqueous solutions can be performed at room temperature without additives and heat treatment. To produce high total soluble solid content juice, multistep membrane processes are efficient, which contain a clarification step - Microfiltration or Ultrafiltration, preconcentration step - Nanofiltration or Reverse Osmosis and final concentration step - Membrane Distillation or Osmotic Distillation. The product of Microfiltration or Ultrafiltration process is a clarified and sterilised juice with negligible loss in total soluble solid content (TSS). In the next step, juice should be pre-concentrated by Nanofiltration until 18 °Brix, or by Reverse Osmosis until 28°Brix of TSS. The final step should be Membrane or Osmotic distillation where the TSS reaches 70°Brix. By this complex membrane technology valuable components of fruits can be concentrated, and a good product could be prepared with a good quality and high nutritional value. In this lecture the application of membrane processes in fruit juice production will be reviewed, using up to date literature survey of the topic, and demonstrating some case studies.

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O158

ULTRASOUND TECHNOLOGY IN FOOD PROCESSING AND PRESERVATION

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Consumers' need for safe and minimally processed foods continues to drive the food industry to pursue new and mild food processing and preservation technologies. Ultrasound is one such technology that might provide safe, fresh, and tasty and nutritious foods for consumers. Power ultrasound has been found to be effective in microbial and enzyme inactivation, bio-component separation, interface heat and mass transfer enhancement, homogenization, cutting, and extraction of bioactive component(s) in foods and plants. Due to new developments in ultrasound technology, as well as our increased understanding of cavitation phenomena, there has been increased interest in recent years to examine the use of ultrasound as an alternative food processing and preservation tool. Combining sonication with other treatments, such as pH, mild heat, and low pressure, has been found to enhance the efficacy of an ultrasound treatment. Usually an additive and even synergistic effect can be observed for microbial and food enzyme inactivation in a thermal sonication or mano-thermo-sonication treatment. Concerns that the food industry has about the application of ultrasound as a food processing method include the quality of the foods treated with ultrasound, as well as the scale-up and economic issues. A summary about ultrasound technology and our understanding of the mechanisms of how ultrasound works, together with information explaining the benefits and pitfalls of power ultrasound as an alternative food preservation and processing method will be presented.

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O159

POTENTIAL APPLICATIONS OF HS-SPME/GC IN OXIDIZED VEGETABLE OILS

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Degradation of lipids results in the formation of volatile compounds that affect the flavor and safety of food products. HS-SPME/GC is a simple, rapid and reproducible method for the analysis of volatile compounds in the HS of commercial vegetable oils. The SPME technique eliminates most of the frawbacks. Thus, it has been applied in the variety of analytical applications since first being described. In the present study, HS-SPME/GC was evaluated as a tool for determining the rate of oxidation by measuring the production of hexanal as a secondary breakdown product in oxidized soybean oils. This method can be used as a quality control and research tool for the evaluation of flavor quality and screening for oxidation of vegetable oils.

Keywords: Vegetable oil, quality, headspace (HS), solid phase microextraction (SPME), GC, hexanal, volatile compounds, linoleic acid peroxidation, peroxide value (PV), oxidation, method, flavor quality

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O160

DETECTION OF ACCIDENTAL FISH DEFROSTING USING NON-DESTRUCTIVE ULTRASONIC TECHNIQUE

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A non invasive ultrasonic method is used to detect whether or not the frozen fish has suffered a partial or total accidental thawing. The time of flight and the peak to peak amplitude of the ultrasonic signals backscattered by fish are recorded during thawing. After many experiences, the comparison of the evolution curves and images corresponding to first and second thawing shows indicators of accidental thawing. The monitoring of third thawing showed that the evaluation of thawing process can be reduced to the evaluation of the water content lost by fish. The attempt to replace the original water lost by fish in first thawing is investigated. The experiences on fish thawing show that the increasing of transducer frequency gives more information about the beginning of fish defrosting. Consequently, the ultrasonic technique is a good tool to control and monitoring fish quality in real time and it can be used in food industry.

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O161

FOOD SAFETY ISSUES/ CHALLENGES IN THE 21ST CENTURY AND THE APPLICATION OF PREDICTIVE MICROBIOLOGY

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Food safety is an increasingly important public health issue and remains at the forefront of societal concerns in recent years. Major food safety issues and related challenges for today and those that will continue in the future include the need to control established and emerging foodborne pathogens, especially those with increased virulence and low infectious doses, including pathogens resistant to antibiotics and food-related stresses. Additional pathogen-related concerns include animal manure treatment/disposal and related environmental issues, cross-contamination of food with enteric pathogens, the need for real-time detection of pathogens to identify them at the point of contamination in the food chain, foodborne illness surveillance and food attribution activities, and food safety management through the development of risk assessment based food safety objectives. There is a need to conduct microbiological risk assessments in order to identify risk factors and to establish food safety objectives, before setting performance and process criteria for the industry to achieve through HACCP. These activities will need to be based on proper research to fill data gaps identified by risk assessments, and application of predictive microbiology and mathematical modeling concepts to better understand pathogen responses under various conditions of product processing and handling. One tool to predict food formulation, as well as to estimate the consequences of food handling and processing operations on growth, survival and inactivation of various foodborne pathogens is the US Department of Agriculture-Agricultural Research Service (USDA-ARS) Pathogen Modeling Program (PMP). In addition to food safety issues/challenges, this presentation will address the key features and usefulness of the PMP for enhancing the safety of processed meats and poultry products.

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O162

IMPLEMENTATION OF FOOD SAFETY LEGISLATION IN CATERING ESTABLISHMENTS IN LATVIA

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The aim of the research was to evaluate the results of implementation of food safety legislation in catering establishments in Latvia. To assess the degree of implementation of hygiene prerequisites and HACCP principles, the state's monitoring data on surveillance of catering establishments were analysed, taking into account the time period of 2004-2009. The statistical analysis of the monitoring data was performed to reveal shortcomings of the food legislation implementation. Conformity of certain hygiene criteria was evaluated including hygiene of premises, equipment and utensils, personnel hygiene and training, fulfilment of hygiene requirements during technological processing and packaging of food, follow-on the food expire date and storage temperature, compliance of potable water, as well as traceability and labelling of food. Together with the actual implementation of hygiene measures the overall evaluation of the development of HACCP plan and introduction of HACCP procedure was analysed. The results of the research suggest that the main problems during introduction of HACCP procedure in catering area are related to adequate implementation of prerequisite programs. Microbiological testing of food and environmental samples could be helpful tools for development and validation of HACCP procedures to assess potential risks and to establish critical technological steps in catering establishments.

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O163

NEW GLUTEN LABELLING - HOW SAFE ARE CELIAC SUFFERERS?

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Celiac disease has been recognized as a serious chronic health condition caused by the consumption of wheat, rye and barley by susceptible individuals. Regulations introduced in the mid 2000's for the labelling of food allergens also address the definition and labelling concerning gluten. However, celiac disease is an immune intolerance, not an allergy. Moreover, the prevalence of celiac disease is higher than the prevalence of any single food allergy. To help protect celiac patients, Codex Alimentarius adopted a first labelling Standard in 1979. The most current Codex Standard introduces labelling thresholds for products containing "very low gluten" (<100mg/kg) and "gluten-free" (<20mg/kg). This recommendation has been incorporated into the European Regulation in January 2009 (EC 41/2009). The problem is, however, the determination of the actual gluten content to justify the use of "very low gluten" or "gluten-free" labelling. While Codex Alimentarius recommends one specific antibody-based assay, routine tests have shown that the test results can significantly vary among assays, and the true gluten content remains elusive as none of the tests is known to accurately determine the actual level. Can food still be safe for celiac sufferers considering all these uncertainties? The presentation will address these issues.

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O164

INTERNATIONAL TRADE AND FOOD SAFETY OF HORMONE RESIDUES IN FOODSTUFFS

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Food safety regulations and the perception of risk are different among countries. This can lead to persistent trade frictions and even reduce food trade. The International Agricultural Trade Research Consortium (IATRC) (2001) outlines three disputes that have challenged the use of science as a ground for food safety measures. The first case is where the U.S. and Canada challenged the scientific basis for the 1989 European Union (EU) ban on growth hormones in beef production. Meat and poultry can be contaminated during production processes in many ways. In addition to physical contaminants, meat and poultry can also be contaminated with hormones, drugs, and other compounds that can leave residues in food that can pass from animals to humans through contaminated raw food products. In spite of conclusion of some scientific studies that the use of the hormones for growth promotion purposes is safe, hormones' residues in foodstuffs have hazardous effects such as: affecting the age of puberty, milk-related allergies, tumour formation and cancer.

Keywords: International trade, hormones' residues, tumour formation, cancer

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POSTER PRESENTATIONS

P101

RESPONSE SURFACE METHODOLOGY TO PRODUCE OPTIMAL YIELD OF KEFIRAN: A NOVEL BIOPOLYMER OBTAINED FROM KEFIR GRAINS

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Kefiran exopolysaccharide is a compound which has high pharmaceutical and antimicrobial properties. Thus, much attention should be conducted to determination the optimum conditions the production of these compounds. The results of this research showed that the waste of dairy industrial such as whey can be used to produce kefiran. Response surface methodology was used to determine the optimum processing conditions that give the maximum yield of kefiran from kefir grains using cheese whey. Whey lactose concentration (20–100 g/l), yeast extract concentration (0–24 g/l), pH (3.5-7.5) and temperature (15-35 °C) were the factors investigated. Experiments were designed according to Central Composite Design with these four factors, including central and axial points. A second-order polynomial model was developed using multiple linear regression analysis. The optimum extraction conditions were found to be: whey lactose concentration of 66.63 g/l; yeast extract concentration of 12.62 g/l; pH of 5.7 and extraction temperature of 24.13 °C. Under these conditions, the experimental value was 663±25 which is well in good agreement with value predicted by the model.

Keywords: Central composite design, Cheese whey, Kefiran polysaccharide.

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PRODUCTION OF POLYSACCHARIDE BY BACILLUS SUBTILIS IN WHEY

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The aim of this research was to investigate production of polysaccharide by *Bacillus subtilis* in whey. Whey powder solutions (WPS) (10, 15 or 20%) was inoculated with *B. subtilis* (9.09 log/ml) and incubated at 30°C for 72 h. Viscosity and pH of WPS, the number of vegetative cell and spores were analyzed at 0, 24th, 48th or 72nd h of incubation. The amount of polysaccharide was also determined using phenol-sulphuric acid method. The results indicated that pH decreased from 6.8 to 4.99 in 72 h. Viscosity of WPS increased 1.09-1.21 times at the end of fermentation. The number of *B. subtilis* increased from 9.09 to 11.66, 10.24, and 10.22 log/ml in 10, 15, and 20% WPS during 48 h, respectively. However, at the last 24 h of fermentation the number of vegetative cells decreased by 0.5-1 log/ml and 2.8-4.7 log/ml spores were formed. Moreover, at the end of 72 h, the amount of polysaccharide produced by *B. subtilis* was determined as 396.9, 414.4, and 425.0 ppm in 10, 15, and 20% WPS, respectively. As a conclusion, the result of this study showed that WPS could be used as a fermentation base of *B. subtilis* to produce polysaccharide.

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ENCAPSULATION PROTECTIVE EFFECT UPON VIABILITY OF PROBIOTIC BACTERIA THROUGHOUT STORAGE AND GASTROINTESTINAL TRACT

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Microcapsules (MC) with fresh cultures of potential probiotic strains (*Lactobacillus paracasei* LAFTI® L26, *L. acidophilus* Ki and *Bifidobacterium animalis* BB-12®) were produced by spray-drying using whey protein concentrate (WPC_{50}) with or without L-cysteine (0.5 g/L). After microencapsulation, the MC were stored, in duplicate, at 5ºC over a period of 6 months during which the number of viable cells (VC) were evaluated. After 15, 60 and 120 days of storage, their resistance throughout gastrointestinal conditions was evaluated. In MC without L-cysteine, the VC numbers of *L. acidophilus* Ki and *B. animalis* BB-12® after 6 months of storage decreased from 10^8 to 10^6 cfu/g whereas no decrease was observed for *L. paracasei*. The presence of L-cysteine revealed a positive effect, especially for *L. acidophilus* Ki after 90 days of storage accounting for more than one logarithm cycle increase in viability. Encapsulation had a protective effect on the three probiotic strains when exposed to the gastrointestinal conditions in comparison to their free cells. This effect was particularly significant for *L. acidophilus* Ki in conditions similar to those of ileum/duodenum including the presence of pancreatin and bile salts. Storage time did not affect the resistance of the three probiotic strains to the gastrointestinal conditions.

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EFFECTS OF ENCAPSULATION ON THE VIABILITY OF PROBIOTIC STRAINS EXPOSED TO LETHAL CONDITIONS

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The effect of microencapsulation in an alginate matrix on the viability of several potential probiotic strains (*Lactobacillus paracasei* LAFTI® L26, *L. acidophilus* Ki and *Bifidobacterium animalis* BB-12®), in the presence and absence of L-cysteine, during the exposure to lethal conditions of temperature (55 ºC for *L. acidophilus* Ki and 60 ºC for *L. paracasei* and *B. animalis* BB-12®, during 60 min), pH (3.0 during 6h) and salt (25% during 24h), was evaluated. The microcapsules were prepared via extrusion by aerodynamically-assisted flow. The effect of the disintegration of the microcapsules by mixing with sodium citrate in the enumeration of survivors was also evaluated. The lethal treatments were performed in whey protein concentrate medium and the survivors were enumerated accordingly. In general, the microencapsulated cells were more sensitive to the lethal conditions. The addition of L-cysteine to growth medium did not increase the viability of the tested strains except for *B. animalis* BB-12®. Furthermore, the disintegration in sodium citrate did not affect the viability. The survival of the probiotic strains was dependent on the lethal stress being imposed and planktonic cells were more resistant to the tested lethal conditions. Encapsulation of these probiotic bacteria did not improve their survival through lethal conditions.

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ELABORATION OF FRUIT VINEGARS: TECHNOLOGICAL PROCESS FOR PERSIMMON AND STRAWBERRY VINEGARS

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Fruit surplus is a growing problem in some Mediterranean countries. In fact, less than 40% of the total fruit produced in Spain is considered of first (export) quality. Thus, the aim of the present project is the production of fruit seasoning (vinegar) from two of these very perishable fruits: strawberry and persimmon. Fruit vinegars were produced by two step fermentation: alcoholic fermentation and acetification. Alcoholic fermentation was performed by inoculation using wine starters and spontaneously, to select native microbiota to be used as starters in the future. Acetification was spontaneous and inoculated (only in strawberries). Both persimmon and strawberries were smashed and converted into a thick paste. Sugars from persimmon (110 g/l) got converted after fermentation into 6-6.5% ethanol in 7 to 9 days. The final yield of acetic acid was 5 g/l. Instead, strawberry had much lower sugar content (60-80 g/l). Sugar fermentation was very fast (3-6 days), yet acetification was very slow (about 80 days). The use of selected acetic acid bacteria from strawberry shortens the process to 60 days. Thus, persimmon and strawberry vinegars could be produced easily with selected microbiota from both fruits, successfully maintaining the healthy fruit characteristics by traditional methods.

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APPLE EXTRACT AS AN ALTERNATIVE CARBON SOURCE FOR BACTERIAL CELLULOSE PRODUCTION

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In recent years there has been considerable interest in bacterial cellulose (BC), due to its potential for use in different fields. This study was aimed to investigate the appropriate carbon sources for maximum BC production and to choose an alternative cost-effective carbon source. A total of 30 strains belonging to the genus Gluconacetobacter was isolated from various vinegar samples. Among them, strain A06O2 had the highest cellulose yield. The carbon sources such as glucose, galactose, raffinose, glycerol, fructose, sucrose, mannitol, maltose and lactose in 2% concentration were added to HS medium without glucose. The highest BC yield was obtained from fructose (6.7 g/L), followed by sucrose (5.8 g/L), mannitol (5.0 g/L) and glycerol (4.1 g/L). On the other hand, the relatively low amounts of BC were produced (0.4-1.5 g/L) from other substrates i.e., galactose, maltose, lactose, raffinose, and glucose. As fructose was the best carbon source for BC production, apple extract, natural source of fructose, were used as growth medium. The extract was prepared under laboratory conditions and inoculated with A06O2. After incubation, BC was obtained at 3.3 g/L. Because of its low cost, apple extract was chosen as an alternative carbon source for BC production.

Keywords: Gluconacetobacter sp., bacterial cellulose, carbon sources, apple extract

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EXTRACTION AND PURIFICATION OF C-PHYCOCYANIN (C-PC) FROM CYANOBACTERIAL SPECIES

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C-PC is an accessory photosynthetic pigment of the phycobiliprotein family which can be used as nutrients for both humans and animals, as natural dyes for food and cosmetics and as pharmaceuticals. C-PC is obtained from cyanobacteria in a two-stage process. The first stage involves the preparation of a cell-free extract to dissolve C-PC in water to form a crude extract and the second stage involves purifying the crude extract to obtain C-PC in highly pure form. Various methods such as centrifugation, ammonium sulphate precipitation, ion exchange, gel permeation, hydroxyapatite and expanded bed adsorption chromatography can be employed for extraction and purification of C-PC, but no standard technique to quantitatively extract pigments from micro algae exists. The major limitations of these methods are non-scalability and the length of time required to complete the process. Although several methods have been developed for the separation and purification of C-PC from cyanobacteria, the purity and recovery is relatively low. It is therefore desired to develop a simple, but more efficient method for the separation and purification of C-PC from cyanobacteria with high purity.

Keywords: Phycocyanin, extraction, purification, cyanobacteria

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PCR–DGGE AS A TOOL FOR CHARACTERIZING DOMINANT MICROBIAL POPULATIONS IN THE TURKEY TRADITIONAL FETA CHEESE

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The microbial populations of cheese milk and rennet extracts used in the production of traditional, Turkish feta cheese were identified by Polymerase Chain Reaction–Denaturing Gradient Gel Electrophoresis (PCR-DGGE) analysis of the V3 region of the bacterial 16S rRNA genes. The results obtained by this culture-independent technique were compared to others previously obtained by conventional culturing methods. The components of the microflora of three Feta cheeses, produced by different Turkish manufacturers, were determined by culture dependent and independent techniques. Isolates from cheese were first grouped by PCR-DGGE and then representatives of each DGGE group were sequenced for identification purposes. This study showed that strains belonging to Lactococcus lactis group were the most frequently isolated. Lactococcus lactis subsp. lactis, Lactococcus lactis subsp. cremoris, Lactococcus lactic subsp. bv. diacetylactis, Lactobacillus pentosus, Lactobacillus helveticus, Lactobacillus fermentum, Lactobacillus plantarum, Lactobacillus delbrueckii subsp. bulgaricus, Enterococcus durans, Streptococcus thermophilus and Leunocostoc mesenteriodes species were detected with lower frequency. The sequences of several bacterial DGGE bands from all samples showed less than 98% homology to known, cultured species. This indicates that unknown species are present in the Feta cheese environment and that culture-independent methods are needed to fully characterize this ecosystem. Keywords: Feta cheese, PCR-DGGE, microbial diversity

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IDENTIFICATION of LACTIC ACID BACTERIA IN DIFFERENT TRADITIONAL CHEESES BY USING PCR-DGGE METHOD

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Cheese production is an enzimatic reaction process in which starter cultures of lactic acid bacteria (LAB) play a key role. Presence of wide microbial ecosystem in dairy and dairy products influence flavors, taste and texture of the products. While many bacteria have positive effects on quality of the fermented milk products, others might have negative effects and create disease risk. In recent years, culture-independent methods become powerful tools determining microbial diversity in cheese. Culture-independent methods used as fingerprint of microbial populations, by allowing comparison among the populations and assist to create the index of microbial ecology. Currently, 16S rDNA analysis develop into more efficient techniques by combining PCR– Denaturing Gradient Gel Electrophoresis (DGGE) analysis. In this study, identification of Lactiac acid bacteria from different traditional cheeses such as Lighvan Cheese, Robiola di Roccaverano (PDO) cheese, Provolone del Monaco cheese, Castelmagno PDO (Protected Designation of - Origin of Origin-protected) cheese, Parmigiano Reggiano cheese, Gouda cheese, Egypt Domiati Cheese, Blue Veined Spanish Cheese, Late Blowing Cheese, Water Buffalo Mozzarella Cheese, Stilton Cheese, Pasta Filata cheese by using PCR-DGGE was reviewed to evaluate this technique. Keywords: Different Traditional cheeses, PCR-DGGE, microbial diversity.

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THE STUDY OF PROPERTIES OF MICROBIAL TANNASE ENZYME WITH POTENTIAL USE

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Tannase has multiple applications in different industries including leather, drug, and food industries. The most important application of tannase is in making instant tea and Production of acid galic is used widely in food and drug industries from by-products rich of tannin such as juice processing pulp is another application of tannase. Tannase also is using for producing propyel galat antioxidants, malt polyphenol stabilizing, and desired quality green tea production. This enzyme is produced by both plants and microorganism. Meanwhile, the common and most important technique to yield enzyme and due to its greater stability is using microbial strains and sources compare with the other available methods. Because of the following two reasons the enzyme application has been limited in industry: 1) the production expenses and, 2) lack of sufficient information and knowledge regarding to its physiological properties, enzyme activity regulation mechanism, and finally its various applications so the aim of the present study was to summarize and evaluate the enzyme information regarding to its substrate, sources, metabolic regulatory mechanisms, physicochemical properties, activation inhibitors, and its different applications with the goal to increase its application in food industry.

Keywords: Tannase enzyme, Microbial source, Antioxidant, Food industry

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BIOINFORMATIC CHARACTERIZATION OF FAS AND PKS GENES FROM FOODBORNE ASPERGILLUS FLAVUS

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Many agricultural commodities are vulnerable to attack by a group of fungi that are able to produce toxic metabolites called mycotoxins. Among various mycotoxins, aflatoxins have assumed significance due to their deleterious effects on human beings, poultry and livestock. Food products contaminated with aflatoxins include cereal (maize, sorghum, pearl millet, rice, wheat), oilseeds (groundnut, soybean, sunflower, cotton), spices (chillies, black pepper, coriander, turmeric, zinger), tree nuts (almonds, pistachio, walnuts, coconut) and milk. In this study, the foodborne Aspergillus flavus was used. Comparison of genomic DNA sequence and agarose gel analysis showed that in the genome copy. The BLAST sequence analysis program (http:www.ncbi.nlm.nih.gov:BLAST) was used for initial sequence comparisons, homology searches and sequence retrieval. Multiple alignments of FAS and PKS sequences were performed with ClustalW (version 1.75) program, the aligned sequences were shaded. An amino acid alignment for phylogenetic tree was constructed by ClustalW (1.75) program and the pylogenetically acceptable characters were collected with the help of JalView program. Phylogenetic tree was plotted using neighbor-joining method implemented in MEGA version 4.0 with 1000 bootstrap replicates. In this study, FAS and PKS genes has been bioinformatic characterizasyon from food borne Aspergillus flavus. Overall, the Aspergillus flavus FAS and PKS genes is homologous with those of species.

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USE OF LACTIC STRAINS ISOLATED FROM ALGERIAN EWE'S MILK IN THE MANUFACTURE OF A NATURAL YOGURT

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During this work we have isolated a number of lactic acid strains from ewe's milk collected from different areas of western Algeria. According to physicochemical tests of ewe's milk, the sample on which the measurements were performed: protein, lactose, fat dry matter showed a composition similar to that found in literature. The species were identified according to physiological and biochemical tests as well as on the basis of their fermentation profiles using API 20 Strep and API 50 CHL system for a number of them. The identification revealed the presence of the phenotypes Lactobacillus sp. Lactococcus sp., Streptococcus thermophilus sp. Leuconostoc sp. Pediococcus and Enterococcus sp. The strains were then characterized according to their technological properties. A great diversity of properties among the strains studied was detected. Two strains Lactobacillus bulgaricus and Streptococcus thermophilus have been selected according to their good acidifying activity and production of flavors for the preparation of a yogurt. In parallel, the commercial strains (CHR Hansen, Denmark) were used for the preparation of a yogurt in the same conditions and a comparative study was conducted. The sensory analysis showed that the product manufactured from the isolates showed a cohesiveness and adhesiveness corresponding to standard products. The pH and acidity were also recorded in the accepted levels throughout the storage period.

Keywords: Lactobacillus bulgaricus, Streptococcus thermophilus, yoghurt, technological properties, adhesiveness, cohesiveness, sensory analysis.

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EFFECTS OF PRE-FERMENTATIVE MACERATION IN RED AND WHITE SPANISH WINES

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Pre-fermentative maceration winemaking is a technique that seeks to obtain wines with better sensory and physicochemical characteristics. This is achieved by increasing the final quality of wines, favoring the extraction of phenolic compounds from the skins, using pectinolytic enzymes or cold conditions. This paper attempted to analyze the effect of different maceration techniques on the phenolic composition, color and antioxidant capacity of wines made from Prieto Picudo and Albarin grape varieties during two consecutive vintages. Wines were obtained from six different experiments: control wine, addition of macerating enzymes, maceration under refrigeration at 5 ºC, during 3 and 7 days for red wines and during 8 and 24 hours for white wines and crio-maceration by addition of dry ice pellets during 3 and 7 days for red wines and during 8 and 24 hours for white wines. These experiments were carried out by duplicate. Color parameters, phenolic composition (total polyphenols, catechins, tartaric esters, flavonols and anthocyanins), individual anthocyanins (HPLC), antioxidant capacity (ABTS and FRAP) and scavenger activity were analyzed by duplicate. Pre-fermentative cold treatments allowed to obtain white wines with higher phenolic concentration increasing slightly color intensity and antioxidant capacity. However pectinolytic treatment allowed to obtain red wines with higher phenolic content and therefore greater antioxidant potential.

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IDENTIFICATION OF PHAGE-BACTERIA INTERACTION USING CAPILLARY ELECTROPHORESIS

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Bacteria and viruses can be identified and separated by using capillary electrophoresis (CE). Some reasons of winning the privilege of CE technique are short analysis time, separation efficiency, and low sample consumption. Because of these we used capillary electrophoresis (CE) for identification of bacteria-phage interaction. Streptococcus thermophilus and Lactobacillus bulgaricus strains and their phages were used for these purpose. Separation of bacteria and investigation of phage-bacteria interaction were carried out using CE with polyethylene oxide (PEO). Capillary zone electrophoresis was applied for phage detection. Calibration graphs of bacteria and phages were obtained with R2 values as 0.963 and 0.937, respectively. S. thermophilus B3 industrial strain was infected with its virulent phage for investigation of phage-bacteria interaction. The S. thermophilus culture was destroyed depending on the multiplicity of infection (MOI) value and it was completely lysed when the MOI value was 10. The interaction of S. thermophilus strain with L. bulgaricus phage was also investigated. CE and microbiological analyses showed that the S. thermophilus strain allowed the adsorption of L. bulgaricus phage on its cell wall without damaging.

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ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES OF POLYPHENOLIC EXTRACTS FROM TUNISIAN OLIVE LEAVES

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Polyphenols are a group of molecules from the secondary metabolism of plants. They are known for their antioxidant, antiviral, antibacterial and many therapeutic properties. These antioxidants may therefore play an important role in disease prevention (cancer, aging cell, cardiovascular diseases…). Our work focuses on measuring the polyphenol content of olive leaves of two widely-commercialised Tunisian varieties, known as "Chetoui" and "Chemleli". In addition, we evaluated the antioxidant and antimicrobial potentials of these molecules according to their stage of maturity. Polyphenols were first extracted from olive leaves by a liquid-liquid extraction procedure using 75 % acetone. The polyphenols quantification was performed by the Folin-Ciocalteu method. The DPPH scavenging assay was used to determine the antioxidant capacity of the prepared extracts in comparison to the 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid (Trolox). In order to evaluate the antimicrobial effects, different microbial strains have been tested (*E. coli, Staphylococcus aureus, Bacillus subtilis, Staphylococcus epidermidis, Candida albicans*) using Luria-Bertani (LB) broth. The obtained results showed that the variety "Chetoui" was richer in polyphenols than the "Chemleli". The polyphenolic content of the variety "Chetoui" reached a rate of 1.25±0.10 g catechol equivalent/100g of fresh material, while Chemleli's phenolic content reached 1.0±0.07 g catechol equivalent /100g of fresh material. The variety "Chetoui" exhibited also higher antioxidant capacity than "Chemleli" and reached a rate of 14.1±0.55 mmol of Trolox equivalent (TEAC) per 100 g of fresh material. Regarding the maturity stage of olive leaves, we noticed that the older leaves had the lowest polyphenol content and antioxidant capacity for both varieties. The antimicrobial test showed that the phenolic compounds of the variety "Chetoui" have more pronounced antibacterial and antifungal effects than those of the variety "Chemleli". The largest inhibition zones were observed against *E. coli* and *Bacillus subtilis*. This work allowed us to draw the conclusion that the olive variety and the stage of maturity of the leaves influenced the quantitative and qualitative polyphenolic compounds as well as their functional activities.

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MICROENCAPSULATION OF PROBIOTIC BACTERIA WITH ALGINATE AND MANUCOL MICROBEADS AND EVALUATION OF SURVIVAL IN SIMULATED GASTROINTESTINAL CONDITION

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The objective of this study was to investigate the effect of the encapsulating materials on the duration of the surviving capability of *Lactobacillus crispatus* KPb3 during exposure to simulated gastrointestinal conditions. For this aim, *L. crispatus* KPb3 was encapsulated with 1.5% alginate and 1.5% manucol (food grade alginate) and dripping methods was used. Briefly drops were formed from the alginate-probiotic and manucol-probiotic cell suspension using the Nisco Var A model, laminar-jet-breakup microencapsulator (Nisco Engineering Inc., Zurich, Switzerland) into the hardening solution (0.1 M for alginate and 1 M CaCl2 manucol). After 12 hours in refrigerator, beads were used for the survival activity analysis. To evaluate the survival of encapsulated and nonencapsulated *L. crispatus* KPb3 under conditions that simulated in human upper gastrointestinal transit, an in vitro conditions. The transit tolerance of this strain was determined by exposing the microorganisms at 37 °C to simulated gastric juice (pH 2.0) and simulated small intestinal juice (pH 6.8) successively, and monitoring changes in total viable counts. Coating process in the simulated gastric environment is not effective for preserving microbial viability and in the first 30 minutes, the opening of the capsules result in losing viability of microorganisms. However, in small intestine environment alginate capsules provide the best protection for bacterial cultures comparing to manucol capsules.

Keywords: Microencapsulation, alginate, manucol, *L. crispatus*, simulated gastrointestinal system

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AN INDUSTRIAL-SCALE PLANT DESIGN FOR GLUCONIC ACID PRODUCTION

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The production and utilization of gluconic acid have a wide range of application in the textile, pharmaceutical, food, and construction industries. Some applications in the food industry include its use as a flavoring agent, a component of leavening agent and nutritional supplement. Gluconic acid fermentation is unique from other organic acid fermentation because it is entirely extracellular (i.e. produced outside of the cytoplasmic membrane) in contrast to intracellular production of the latter. This study was prepared not only to design a bioreactor for the production 150 tons of gluconic acid annually from cane molasses by *Aspergillus niger*, which is about 0.5% of world production of gluconic acid for the food industry but also to calculate some critical parameters for fermentation such as maximum biomass concentration, total time of fermentation, required volume and dimensions of bioreactor and seed fermentor, sterilization time for medium in bioreactor and seed fermentor, oxygen uptake rate, speed of impeller, power requirement, superficial gas exit speed, total orifice area, and required total area of filter. The production steps include the preparation of the inoculum, the preparation and sterilization of the medium, the fermentation process, product separation, sodium gluconate formation, and recovery of the sodium salt.

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PHYSICOCHEMICAL PROPERTIES OF SINGLE-CELL OIL PRODUCED FROM WHEY BY FERMENTATION

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Microbial oils, known as single cell oils (SCO), have long been considered as alternative oil sources. Those lipids contain rare polyunsaturated fatty acids (PUFAs) which are produced via microbial fermentation by using carbohydrates. It has been used in the food and pharmaceutical industry and thus attracted the attention of producers because of increasing market value. Recently, there has been increased attention in the field of bio-energy as the starting material for the production of bio-diesel. For economic reasons, media ingredients in the production of culture media are byproducts of other industries such as molasses, sugar beet, whey, and some agricultural wastes. Cheese whey is a by-product of cheese industry. Since it has very high content carbohydrate, many studies have been realized to investigate the possibilities of using whey as a medium in single-cell oil and protein production and ethanol fermentation. The aim of this study was to characterize the physico-chemical properties (acid, saponification, iodine and peroxide values, and refractive index) of single cell oil produced from whey (4.5% of lactose) by using *Mortierella isabellina*. The refractive indice of single-cell oil was about 1.470±0.001. Thus, the acid, saponification, iodine, and peroxide values were found 1.612±0.613 mg KOH/1 g oil, 185.5 ±3.619 mg KOH/1 g oil, 83.878±1.226 g iodine/100 g oil, 20.994±5.891 mequiv/1 g oil, respectively.

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EFFECT OF SEVERAL PARAMETERS ON THE OIL PRODUCTION AND FATTY ACIDS PRODUCED BY GREEN ALGAE CHLORELLA VULGARIS

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Algae are part of photosynthetic organisms. Like plants, algae need water, light and CO_2 to grow but they don't have leaves, stubs, seeds, flower and other similar plant components. Effect of several parameters on the yields of oil production and fatty acid (FA) profile of the produced oil by *Chlorella vulagaris* are investigated in this study. Taguchi's approach (5 factors in four levels with 16 runs) was used to design the experiments. Increasing the concentrations of NaCl and bicarbonate ion (sodium bicarbonate) resulted in corresponding decreases in oil production. Maximum yield of oil production (approximately 19%, w/w, on dry basis) was obtained at 27.0 μM iron and 25±2 °C. Yields of oil production were increased when using red and blue lights as sources of photosynthetic energy. Maximum level of unsaturated FA was produced when the lowest levels of NaCl and bicarbonate ion were used at 27.0 μM iron ($FeSO_4.7H_2O$) level, 25±2 °C temperature with red light. When the Oil production was at its optimum level, ratio of unsaturated to saturated FA was increased. Manipulating the growing conditions of *Chlorella vulgaris* can result in oil with different FA compositions for the various applications in the food industry.

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EVALUATION OF SOME PLANT ESSENCES (THYMUS VULGARIS, MENTHA PIPERITA AND ZIZIPHORA CLINOPODIOIDES) ON THE VIABILITY OF BIO YOGHURT STARTER CULTURE (LACTOBACILLUS ACIDOPHILUS)

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There is a growing interest to use of natural antimicrobial compounds, such as essential oils and spices for the preservation of foods due to posses a characteristic flavor and sometimes show antioxidant as well as antimicrobial activities. In addition, probiotic products highly affect the health of consumers by reducing the risk of heart attacks and improving of desirable micro flora in intestinal tract. This study was designed to evaluate the effect of *Thymus vulgaris*, *Mentha piperita* and *Ziziphora clinopodioides* on growth of *Lactobacillus acidophilus* as bio yoghurt starter culture. Set bio yoghurt was prepared according to standard method with different concentration of essential oils (0, 25, 40, 70, 100, 130 µg/L) of *Thymus vulgaris*, *Mentha piperita* and *Ziziphora clinopodioides*. Viability of *Lactobacillus acidophilus* was investigated during the storage of bio yoghurt at 4 ˚C at different time intervals. The results showed that the number of starter culture in all samples decreased during storage. There was no significant different of essential oils between samples and control ($P < 0.05$).

Keywords: *Mentha piperita*, *Ziziphora clinopodioides*, *Thymus vulgaris*, Yoghurt, *Lactobacillus acidophilus*

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APPLICATION OF MAGNETOTACTIC BACTERIA IN PRODUCTION OF MAGNETOSOME'S NANOPARTICLES

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Magnetotactic bacteria are a heterogeneous group of gram negative prokaryotes which are ubiquitous in aquatic environments. The ability of magnetotactic bacteria to orient and migrate along geomagnetic field lines is based on their unique nano scale organelles, magnetosomes. Magnetosomes are membrane-enclosed inorganic crystals consisting either of the magnetic minerals magnetite or greigite. The particles are usually arranged along the cell axis in one or multiple chains. Particle sizes are typically 35-120 nm. The formation of magnetosomes is achieved by a biological mechanism that controls the accumulation of iron and the biomineralization of magnetic crystals with a characteristic size and morphology within membrane vesicles and involves several steps, including magnetosome vesicle formation, iron uptake by the cell, iron transport into the magnetosome vesicle and controlled magnetite or greigite biomineralization. Nano-sized magnetosomes have a number of in vitro application; such as immobilization of proteins, peptides, enzymes and antibiotics on magnetic particles. In this paper the conditions of nano-sized magnetosome synthesis, properties and application of magnetosomes are investigated.

Keywords: Magnetotactic bacteria, Magnetosome, Biomineralization, Magnetite, Greigite

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ANTIFUNGAL ACTIVITY OF LACTIC ACID BACTERIA

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Lactic Acid Bacteria (LAB) are a physiologically diverse group of organisms, which can be generally described as Gram-positive, nonsporing cocci or rods with lactic acid as the major product of carbohydrate fermentation. They are very important due to the common usage in the production of fermented dairy, vegetable, fruit, meat and cereal products. LAB are natural biopreservatives. Biopreservation refers to extended shelf life and enhanced safety of foods obtained by using the natural or added microflora and their antimicrobial product. In recent years, the interest on consuming natural foods is getting increase. Because of LAB are natural biopreservatives and increasing demand of consumers for natural food products, research on antifungal LAB have been stimulated. LAB can produce antifungal substances with the capacity to inhibit food-borne fungi, both yeasts and moulds that cause serious spoilage of food. Moulds may also produce healthdamaging mycotoxins. Detoxification of mycotoxin by LAB is very important for human health. These antifungal metabolites are lactic acid, acetic acid, diacetyl, hydrogen peroxide, reuterin, phenyllactic acid, carbon dioxide, caproic acid, cyclic dipeptides, 3-hydroxylated fatty acids. The aim of this review is to give information about properties and potential applications of antifungal substances producing by lactic acid bacteria.

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BACTERIOCINS OF LACTIC ACID BACTERIA AND THEIR FOOD APPLICATIONS

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Bacteriocins are proteinaceous antibacterial compounds, which constitute a heterologous subgroup of ribosomally synthesized antimicrobial peptides. In general, these substances are cationic peptides that display hydrophobic or amphiphilic properties and the bacterial membrane is especially the target for their activity. The anionic lipids of the cytoplasmic membrane are the primary receptors for bacteriocins of bacteria for initiation of pore formation. Three types of localizations of the bacteriocin operons have been reported till now by the authors: on the bacterial chromosome, on plasmids and on transposons (both plasmids and chromosome carried). Bacteriocins are classified into separate groups such as the lantibiotics (Class I), the small (<10 kDa) heat-stable postranslationally unmodified non-lantibiotics (Class II) and the large (>30 kDa) heat-labile non-lantibiotics (Class III). Many lactic acid bacteria (LAB) produce bacteriocins with rather broad spectra of inhibition. Some important bacteriocins of LAB are nisin, diplococcin, acidophilin, bulgaricin, helveticins, lactacins and plantaricins. Several LAB bacteriocins offer potential applications in food preservation, and the use of bacteriocins in the food industry can help to reduce the addition of chemical preservatives as well as the intensity of heat treatments, resulting in foods which are more naturally preserved and richer in organoleptic and nutritional properties.

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ENZYMES IN FOOD SCIENCE AND TECHNOLOGY

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Enzymes are proteins with special ability to catalyze specific chemical reaction in living matter. They are usually very specific as to which reactions they catalyze and the substrates that are involved in these reactions. All of them act by reducing Activation energy. Enzymes can be useful or harmful one the basis of their functionality. Their functions consist of: Processing aid, Indicator of circumstance or existence different materials in products, Removing or reducing toxicants (undesirable compounds in food), Finally they will work in the modification in properties of materials to improve the accepted properties of food and Demolition in food's structure, Creation spoilage and unacceptable changes in length of processing and keeping the foods. Enzymes have several of application in food industry and the other industries. To make use of enzymes we must can be consider optimum conditions of utilization of them. With inhibition and adjustment the amount of presence and activity of enzymes in raw materials, process and final product by inhibitors and making special conditions in special manner of producing we can producing product with high quality and more shelf life. Immobilizing of enzymes by intermediation neutral beds one of the methods for increasing of efficiency that it has to be achieving by different methods. The role of enzymes in human health and the other living beings is undeniable. The development and variety of needs for this group of products detect the necessity of research and spend money in this branch of industry.

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MICROBIOLOGICAL METHODS OF ENZYME PRODUCTION

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Enzymes are organic biomolecules in protein structure that catalyze biochemical reactions as performing major metabolic events in cell. In industrial enzyme production, microbiological enzymes are preferred rather than enzymes that produced by herbal or animal sources. Nowadays, most of the enzymes are produced microbiologically as amylase, elastase, glucose isomerase, invertase, catalase, lactase, lipase, protease, rennin etc. The very first years of studying microbiologically enzyme production, a little bit number of microorganisms was used. But today, microorganism species and numbers are increased. These microorganisms must be suitable for using aim, non-toxic and non pathogenic, biologically stable and pure. Also, they must protect their activity. These properties are important in respect to enzyme quality and productivity. Fermentation medium and purification method which provide enzyme ready to use are very important like microorganism species. Liquid state fermentation and solid state fermentation is used in microbiologically enzyme production. Produced enzymes are separated fermentation media with some methods as settling by chemicals, filtration, centrifuging. These enzymes are purified using different methods like ultracentrifuge, adsorption and ion exchange system according to desired purification level.

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SINGLE CELL PROTEIN PRODUCTION AND APPLICATION IN FOOD INDUSTRY

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Most of the countries in the world have poor nutrition and malnutrition problems. Poor proteinaceous nutrition is the one of the major problem while world population increases highly. Because of the traditional protein sources couldn't answer the requirement of nutrition, investigation of the alternative proteinaceous sources must be necessary. Thereupon single cell protein production from agricultural waste is increased. Before the usage of these materials, they are hydrolyzed by physical, chemical or enzymatic methods. Single cell protein is produced from many species of microorganisms. Yeasts, algae, fungus, and bacteria can be utilized as single cell protein sources. Single cell proteins have some disadvantage (highly level of nucleic acid, digestion problems, allergic effects etc.) which is restricted usage of them directly in food or food additives production. In this article, it is examined that production and usage of single cell protein, production sources (microorganisms and materials) and new developments.

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THE EFFECT OF MICROORGANISMS IN THE AROMA FORMATION OF FOODS

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Aroma materials in foods are low amount and essential organic compounds. Aromas are seperated three types, such as natural aromas, identical to natural aromas and artificial aromas. Because of playing and important role of the food production, the forming specific aroma and extension of the shelf life, microorganisms are indispensable especially for fermentation technology (vinegar, organic acid, ethyl alcohol, enzyme, protein, lipid and vitamins, etc.), meat products (the sauce of fish, fermented sausage, etc.), milk products (yogurt, cheese, etc.), floury products technologies (bread, etc.). The distinctive aromas of these foods are formed the result of different chemical and biochemical reaction of the kind of the bacterium (*Lactobacillus*, *Micrococcus*, *Pediococcus*, *Streptococcus*, etc.) yeast (*Debaryomyces*, *Saccharomyces*, etc.) and mold (*Aspergillus*, *Rhizopus*, *Mucor*, *Penicillium*, etc.) type of species. In spite of microorganisms are useful, the result of growing microorganisms which have been natural flora of foods or contamination from out side, they can cause harmful effect on food quality (especially aroma) and the human health.

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"DESIGNER" MILK

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Dairy biotechnology is fast gaining ground in the area of altering milk composition for processing and human health by employing nutritional and genetic approaches. "Designer" milks that are improved raw materials can be approached through various combinations of genetics and by farm and feed management. Altered fatty acid profiles in milk is included more healthy fatty acids such as CLA and omega fatty acids, reduced lactose content for cater to persons suffering from lactose intolerance and removed b-lactoglobulin (for cow milk allergenicity in children) from milk improved amino acid profiles are some challenges of "designing milk" for human health benefits. From a technological point of view, there exist vast opportunities in: alteration of primary structure of casein to improve technological properties of milk, , engineering milk meant for cheese manufacturing that leads to accelerated curd clotting time, increased yield and/or more protein recovery, milk containing nutraceuticals and replacement for infant formula. Transgenic technology has also produced of farm animals that secrete in their milk, human lactoferrin, lysozyme, and lipase so as to simulate human milk in terms of quality and quantity of these elements that are protective to infants.

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INFLUENCE OF ESSENTIAL OIL FROM SATUREJA HORTENSIS L. AND THYMUS FALLAX F. ON SHELF LIFE OF TOMATO

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Tomato (Lycopersicon esculentum Mill.) is one of the most widely grown and popular vegetable crops in the world, and there is a general trend to consume fresh fruit. In this study investigated the effectiveness of the essential oils obtained from Satureja hortensis L. and Thymus fallax F. on shelf life of tomato under storage condition. Four tomatoes fruits were separately placed into one polystyrene container (9x10x12 cm) with snap-on lids. Three different amounts of the essential oil (0.11, 0.22 and 0.45 mL/cm^3) dripped on to a filter paper (3 x 3 cm^2) were placed into individual small beakers, which were subsequently placed inside the plastic containers just before the lids were covered. Control samples were handled similarly with the exception of the volatile treatments. The data obtained from the experiments were subjected to analysis of variance (ANOVA) using the SPSS statistical software package (SPSS, Version 10.0). The all concentrations of the oils tested reduced decay of tomatoes compared to controls, in particularly at 0.45 mL/cm^3 concentrations of T. fallax. Decay reducing effect of the oils on tomatoes increased with increase in doses of the oil. The present results showed that S. hortensis and T. fallax essential oil have a significant reducing effect on the decay of tomatoes during storage at room temperatures.

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Keywords: Essential oil, fruit decay, Satureja hortensis, shelf life, tomato, Thymus fallax

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THE APPLICATION OF TRITICALE MALT AS THE SUBSTITUTE FOR BARLEY MALT IN WORT PRODUCTION WITH THE ADDITION OF β-GLUCANASE

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The aim of this paper was to investigate the possibility of triticale malt application as the partial substitute for barley malt in wort production. Triticale is the first manufactured cereal derived from an amphiploid between wheat and rye. Triticale shows promising brewing properties. Some triticale varieties contain very high levels of amylolytic activity. For wort production two series of experiments were performed in which triticale malt produced from triticale variety NST 3/07 (from experimental fields, Rimski Šančevi location - Serbia) was used as the substitute for barley malt in grist with and without the addition of commercial enzyme Ultraflo Max with β–glucanase activity (Novozymes, Denmark). Triticale malt was added in each of the carried series of experiments as the substitute for barley malt: 0, 10, 20, 30, 40, 50, and 60% in grist. With increase in the content of triticale malt in the grist, viscosity increased. The addition of commercial enzyme Ultraflo Max significantly reduced wort viscosity as well as wort colour, within all investigated ratios of barley malt replacement, which improved wort quality. Worts produced with the application of triticale malt (produced from triticale variety NST 3/07) could be used for lager beer production.

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EFFECTS OF GAMMA-IRRADIATION ON WHITE-WINE SAMPLES

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Various kinds of electromagnetic irradiation have been used on certain food and beverage items, with ultimate objectives (a) to reduce and/or eliminate microorganisms (together their metabolites/toxins), (b) to extend their shelf-life and (c) to destroy potentially hazardous compounds like allergenic proteins. In parallel, a concern is taken, in order to retain some of the healthy food constituents like vitamins and other antioxidants of the irradiated products. In this study, the white vine variety "Chardonnay" was used. The selected bottled wine samples were irradiated using a Cobalt-60 source, at doses varying from 1-5 kGy/h. Results indicate that application of higher doses of Co-60 results on unacceptable products as the ones characterized mainly by the presence of off-flavors and negative sensory evaluation, in general. Concerning the 1kGy irradiated wine samples, their major organoleptic parameters seem to remain unaffected by this kind of electromagnetic irradiation. The antioxidant capacity was measured with DPPH assays and the amount of total phenols was determined according to the Folin-Ciocalteu colorimetric method. Although a free radical - induced degradation of polyphenols is possible to occur after irradiation, neither the antioxidant capacity nor the total phenols were significantly altered.

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IDENTIFICATION OF INDIGENOUS WINE YEASTS BY DIFFERENT MOLECULAR METHODS

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Yeasts have traditionally been identified using classical biochemical methods. However, these methods are laborious, time consuming and can give equivocal results. With the progress in molecular biology, DNA-based molecular methods have widely been used for identification of yeast strains. In this study, it is purposed to perform molecular identification of yeast strains which had previously isolated from different wine regions in Turkey and identified by biochemical tests. PCR techniques which are based on using primers complementary to repetitive DNA sequences such as REP and ERIC were applied to identification of 10 indigenous wine yeast strains and 6 reference strains. RFLP-PCR that is based on PCR amplification and subsequent restriction analysis of the internal transcribed spacers (ITS) region and the 5.8S rRNA gene was also used. The identification was completed by DNA sequence analysis. In conclusion, REP-PCR, ERIC-PCR and RFLP-PCR techniques can be used for species-level identification of yeast belonging to genus *Saccharomyces*. It was determined that the results of DNA sequence analysis were consistent with either the results of REP-PCR, ERIC-PCR and RFLP-PCR or biochemical tests. Within the 10 local yeast strains, 7 were identified as *S. cerevisiae*, one was identified as *S. paradoxus* and the other one as *S. boulardii*.

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CONVERSION OF LIGNOCELLULOSIC BIOMASS TO NANOFIBRILS TO ENHANCE ENZYME HYDROLYSIS

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Lignocellulosic biomass has gained a great deal of interest due to its conspicuous feature of being a raw material for the renewable energy source, bioethanol and also other products such as antibiotics and enzymes. However, its complex structure causes a residual resistance to microbial and enzymatic deconstruction. Here, the aim was to determine the effect of microfluidization on the efficiency of enzyme hydrolysis by reducing the size of cellulose into nano-fibrils. Wheat bran was used as biomass and a commercial cellulase (Celluclast) and β-glucosidase were used as enzymes. During microfluidization aqueous suspensions of milled wheat bran were forced through microchannels at high pressures. Hydrolysis was performed in a medium of pH 4.8 at 50 °C; reducing sugar was determined by the DNS method. Comparison was also made with other standard techniques. As a result, the enzymatic degradation rate of microfluidized samples was four times faster than untreated ones and 5% solid load with 4.5 U/g cellulase activity was determined as the optimum condition for hydrolysis. It is estimated that the implications can be used one step forward for the pretreatment of lignocellulosics due to the relationship between hydrolytic potential of cellulase mixtures and the nature of substrates, i.e. morphology, crystallinity.

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SOME PROBIOTIC PROPERTIES OF ENTEROCOCCI STRAINS ISOLATED FROM TURKISH AND IRANIAN WHITE CHEESE

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In our study, *Enterococcus faecium* (28 strains), *Enterococcus faecalis* (13) and *Enterococcus durans* (2) were isolated from Turkish and Iranian white cheeses. The amount of produced lactic acid and hydrogen peroxide productions of *Enterococcus* spp. were determined. Different amounts of lactic acid were produced by strains studies; however, lactic acid levels were 0.46–1.10%. The obtained results of the hydrogen peroxide reveal that its maximum production was 3.91 µg/mL (*E. faecium* RI55) while its minimum production was 0.57 µg/mL (*E. faecium* RT101). Antimicrobial effects of *Enterococcus* spp. strains on *E. coli* O157:H7, *S.* Entritidis ATCC 13076, *S.* Typhimurium MU 80, *S. aureus* ATCC 25923, *L. monocytogenes* ATCC 7644 were also determined by an agar diffusion method. The highest antimicrobial activity of strains was 8.00 mm against *S.* Enteritidis ATCC 13076, whereas the lowest antimicrobial activity of strains was 2.40 mm against *E. coli* O157:H7.

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DETERMINATION OF THE STARTER AND DAIRY PROPIONIC ACID BACTERIA (PAB) COMPOSITION OF HOME-MADE TRADITIONAL TURKISH CHEESES AND THEIR GROWTH CONDITIONS UNDER DIFFERENT SALT CONCENTRATION AND TEMPERATURES

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In this study the starter bacteria and dairy propionic acid bacteria (PAB) content of 40 different home-made traditional Turkish cheeses was determined. The numbers of PAB ranged from a minimum of 2.0±0.2 cfu/g to a maximum of 5.4±0.2 cfu/g. Starter bacteria levels determined as 4.3-8.8 cfu/g. Salt concentration of these cheeses samples ranged from 0.5% to 12.9%. Thirty-two strains of PAB isolated from 8 cheeses samples [Balıkesir Mihaliç Cheese (2). Balıkesir Sepet Mihaliç Cheese (2). İzmir Tulum Cheese (2), Kars Gravyer Cheese (2)]. All these strains tested under different incubation temperatures (30; 37 and 45 °C) and concentrations of NaCl (0.5; 1; 2; 3; 6.5; 7; 8; 10; 11 %). All strains showed growth in different incubation temperatures. The optimal condition was 30 °C. In the presence of 11 % NaCl, *P. freudenreichii* subsp. *freudenreichii* IT4, KG3 strains strongly inhibited, while *P. freudenreichii* subsp. *freudenreichii* IT15, KG8, KG13, *P. freudenreichii* subsp. *shermanii* KG12, KG15, MP13, P. jensenii MP3, MP7, BSM6, BSM8 strains had good growth. P. jensenii IT3, IT9, KG4, MP4, BSM2, *P. freudenreichii* subsp. *freudenreichii* IT19, BSM3, *P. freudenreichii* subsp. *shermanii* KG2, KG6, KG14, BSM1, BSM5 strains showed high growth at 6.5% NaCl concentration. An extreme adaptability of PAB was noted as low temperature (30 °C) and high salt concentration (<2%) could effectively development during the ripening of traditional Turkish cheeses.

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EFFECTS OF FREE FATTY ACIDS AND NISIN ON THE DAIRY PROPIONIC ACID BACTERIA ISOLATED FROM TURKISH TRADITIONAL CHEESES

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The influence of seven different free fatty acids and nisin on the growth and metabolism of the dairy propionibacteria has been studied in this work. Propionic acid bacteria (29 strains) used in this study isolated from traditional Turkish cheeses. For determination of fatty acid effect, cultures were carried out at 30°C in 10 mg /l of each fatty acid in the YEL medium. Bacterial growth was followed by optical density measurements (at 600 nm). Inhibitory effect of fatty acids on the strains ranged from 0.0% to 60%. Linoleic acid had no inhibitory effect on *P. freudenreichii* subsp. *freudenreichii* SP5 and P. jensenii SP7 strains. Also, *P. freudenreichii* subsp. *freudenreichii* DO7 and *P. jensenii* DO6 strains not sensitive to sodium propionate fatty acid (0.0%). Inhibitory effect of nisin (50; 100; 150; 200; 250 and 300 μg /ml concentrations) on Propionibacterium strains was evaluated using the agar diffusion method. Nisin (300 μg /ml) was found highly effective against the strains (diameter of the inhibition zone, 6.2-14.2 mm). *P. freudenreichii* subsp. *freudenreichii* SP4 strain showed resistance to 50; 100; 150; 200; 250 μg /ml nisin, whereas this strain was sensitive to 300 μg /ml concentrations. 50 and 100 μg /ml nisin concentration has no inhibitory effect on *P. freudenreichii* subsp. *freudenreichii* DO7, DO9 and SP3 strains. Nisin is a potential food preservative since it is able to inhibit outgrowth of spores of *Bacillus* sp. and *Clostridiuim* sp. It is widely used in European countries as a food preservative in dairy products and canned foods. These fatty acids influence the rheological properties, the flavor and the microbial transformation of the cheese.

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RHEOLOGICAL CHARACTERIZATION OF BARBERRY EXTRACT

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Rheology is the science of deformation and flow behaviour of matter. The consistency of a Newtonian fluid like water, milk or clear fruit juice can be characterized by the term viscosity. Viscosity of non-Newtonian fluid however changes with changing rate of shear and hence should be characterized by more than one parameter. Flow characteristics and the rheological behavior of barberry (Berberis vulgaris) extract was carried out using a rotational viscometer at temperatures between 20 and 50 ˚C and at concentrations of 14%, 20%, 30%, 40% and 50% total soluble solids. The power law model was fitted to the experimental results. The value of flow behavior index (n) was more than unity, at all temperature and concentrations indicating the shear thickening nature of the barberry extract . The effect of temperature on viscosity was evaluated using Arrhenius equation and then activation energies were found.

Keywords: Barberry; power low model; viscosity; shear rate

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PHYSICAL PROPERTIES OF SUNFLOWER SEEDS

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The physical properties of sunflower seeds (*Helianthus annuus* L.) were determined as a function of moisture content in the range of 0. 04-0.33% dry basis (d. b.). The average length, width and thickness were 11.40; 6.44 and 3.98mm, at a moisture content of 0.04 d. b., respectively. In the above moisture range, the arithmetic and geometric mean diameters increased from 7.27 to 7.69mm and from 6.62 to 7.10mm, respectively, while the sphericity increased from 0.583 to 0.607. In the moisture range from 0.04-0.33% d. b., studies on rewetted sunflower seeds showed that the thousand grain mass increased from 81.46 to 100.97g, the true density from 648 to 925kgm-3, the porosity from 33-56%. The bulk density decreased from 439.20 to 413.08 kgm-3 with an increase in the moisture content rang of 0.04-0.33% d. b. the static coefficient of friction of sunflower seeds increased the linearly against surfaces of six structural materials, namely, aluminum (0.29-0.58), Stainless steel (0.35-0.6), galvanized iron (0.41-0.59), rubber (0.41-0.58), wood (0.41-0.61) and cement (0.43-0.62) as the moisture content increased from 0.04-0.33% d. b.

Keywords: Sunflower seeds, physical properties, moisture content

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EFFECT OF WHEAT BUG DAMAGE ON THE PHYSICAL DOUGH PROPERTIES AND SEMI FLAT BREAD BAKING QUALITY OF DIFFERENT IRANIAN WHEAT CULTIVARS

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Effect of different percentage of bug damaged wheat on quality of flour, dough and barbari bread was measured .bug damaged grains of cultivated wheat simples were gathered in 2003. The bug damaged, grains in different portion (1, 2, 3, 4, 5, 6, percent) were added to fourwheat cultivars namely alamout, India, chamran and shahriar. Farinograph results indicated that except for water absorption factor which remains unchanged in different percentage, the other factors vary under the treatments. Amount of wet gluten was unchanged, but gluten index increased by increment of bug damaged grains. Compared to control sample, bread obtained from flour sample of higher damaged percentage has higher special weight .analytical evaluation of the result showed that the effect of wheat bug on quality of flour, dough and bread significantly varies in different wheat cultivars.

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SELF-ASSEMBLY PROCESS OF Γ-ORYZANOL + Β-SITOSTEROL FIBRIL FORMATION IN EDIBLE OIL ORGANOGELS

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Organogels find a wide application in different industries like foods, pharmaceutics and cosmetics. Several types of structurant agents such as crystalline triacylglycerols (TAGs) have been used to structure edible oils for different food applications. TAGs contain high levels of saturated fatty acids which may increase the cholesterol level in blood as well as the risk on cardio-vascular diseases. Mixtures of plant sterols (i. e. γ-oryzanol and β-sitosterol) seem to be a promising alternative structurants to TAGs; as these materials are derived from edible sources, totally free of saturated fatty acids and have a cholesterol lowering effect. Mixtures of γ-oryzanol and β-sitosterol were reported to self-assemble into fibrils that function as building blocks to form translucent, firm and thermo-reversible organogels. In this study, the critical aggregation concentration (CAC) of γ-oryzanol and β-sitosterol fibril formation was investigated using light scattering, rheology and microscanning calorimetry (Micro DSC). Using the thermodynamics of self-assembly the enthalpic and entropic contribution to the fibrillisation process was determined. The formation the fibrils was associated with negative enthalpy change (ΔH^0) compared with positive entropy term ($-T\,\Delta S^0 > 0$), showing that the aggregation to the fibrils is an enthalpy driven process. The binding Gibbs free binding energy determined at the corresponding temperatures and CAC's was quite low, in order of 2 RT (4. 5 kJ mol-1), which is in agreement with the reversibility of the aggregation process. The temperature at which aggregation to the fibrils (formation of the fibrils) starts depends on the oryzanol-sitosterol ratio. Aggregation of solutions with ratio of (60 oryzanol-40 sitosterol w/w) started at higher temperature during cooling than other ratios.

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SOME PHYSICAL AND MECHANICAL PROPERTIES OF ROASTED ZERUN WHEAT (KAVURGA)

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Whole grains may increase satiety and reduce energy intake. Roasted wheat made from whole grain is produced from bread wheat preferentially, zerun wheat and it is used as snack food in central Anatolia. It is known as "kavurga" and generally produced in home for domestic consumption or commercially produced by small-scale manufacturers. Roasting is enhanced the flavor and improved sensory properties of the wheat grains. Roasting temperature generates superheated steam and builds pressure within the grain. Majority of grains get popped during roasting. The physical properties of roasted wheat are important for the design of equipment for processing, separating, packing and transportation. Moreover, knowledge of the mechanical properties is key parameters for the evaluation of textural characteristics of the roasted wheat. In this study some physical and mechanical properties such as dimensions, geometric mean diameter, geometric mean diameter, bulk density, true density, porosity, 1000- unit mass, angle of repose, coefficient of static friction on various surface and rupture force in 2 axes, were determined at four levels of moisture contents ranging from 8.9% to 25.0% wet basis for roasted wheat. In addition, the effects of moisture content of wheat grains on expansion-volume of roasted wheat were evaluated.

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SOME PHYSICAL PROPERTIES OF DRIED BERBERIS FRUIT (BERBERIS CRATAEGINA)

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Berberis crataegina is a shrub in the family Berberidaceae, and grow in Asia and Europe; the plant is well known in Turkey. The fruits of the plant are varying from dark purple to black. Fruits are edible, and rich in vitamin C. Berberis fruits contain a large amount anthocyanin and they are potentially a good source of antioxidants. Berberis fruit has been used traditional medicine in Turkey especially central Anatolia region. Fruits are processed into natural juices, marmalades and jellies and also dried in sun. Dried fruits are very important in a part of daily diet of Anatolian people because of possible health benefits. In order to design of equipments for the harvesting, processing and transportation, separating and packing of dried Berberis fruits, it is necessary to know about the physical properties. Therefore, some physical properties of dried Berberis fruit (*Berberis crataegina*), namely dimensions, geometric mean diameter, thousand seed weight, bulk density, true density, porosity, angle of repose, coefficient of static friction on various surface as a function of moisture content, 9,56 % to 15.86 % (w.b.) were investigated. All the experiments were replicated five times for each sample and the average values were reported.

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ANTIOXIDANT PROPERTIES OF VARIOUS SOLVENT EXTRACTS FROM DIFFERENT PARTS OF DRUMSTICK TREE (MORINGA OLEIFERA)

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Moringa oleifera (M. oleifera) is rich in various nutrients, extensively uses in treating a variety of diseases in Southeast Asia. The study was to investigate the antioxidative capacities of extracts of *M. oleifera* using different solvents and antimutagenic activity by Ames test. The ethyl acetate or methanol extracts from different parts of *M. oleifera* (roots, stems, and leaves) were used to study the antioxidant activity and shown that methanol extracts from *M. oleifera* had better antioxidant capacity than that with ethyl acetate extraction in vitro. Moreover, the extracts of leave had the best antioxidative ability than that of stems and roots. The Ames test showed that the methanol extracts from *M. oleifera* leaves had antimutagenicity on *S. typhimurium* TA 100 at the dose of 0.02-0.04 mg/plate. In conclusion, the methanol extracts from M. oleifera leaves had the best antioxidant capacity in vitro and also had antimutagenicity at low dose extracts.

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SYMBIOSIS BETWEEN PREBIOTIC COMPOUNDS AND BIFIDOBACTERIUM LACTIS B94 IN CHEESE: EFFECT ON LIPOLYSIS

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Over the last decade cheese has been shown as a suitable vehicle to support viable probiotic microorganisms. However, studies on probiotic cheeses are still scarce and there is interest in studying new potential products, in particular, synbiotic foods. The prebiotic compounds, inulin and fructooligosaccharides, were studied in order to evaluate their potential effect on growth/survival of *Bifidobacterium lactis* B94 in cheese and simultaneously evaluate their technological potential through the characterization of lipolysis in cheeses with or without addition of FOS or FOS/Inulin (50:50) over 60 days of ripening. In all three types of cheese an exponential increase of viable cells of *B. lactis* B94 was observed up to 15 days reaching values of 10^{10} cfu/g cheese. After this period, the number of viable cells remained almost constant with values above the minimum threshold recommended for a probiotic product with benefits for human health. Lipolysis was characterized by a gradual increase of free fatty acids (FFA) throughout ripening; such increment was higher in cheeses supplemented with prebiotic compounds. Additionally differences in the qualitative profile of FFA were observed and the isomers of conjugated linoleic acids, alpha-linolenic and gama-linolenic were detected after 15 days of ripening, especially in cheeses containing prebiotic compounds.

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WINE - PRODUCT OF FOOD

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A lot of scientists can agree with this title, and not only they but nutritionists and doctors too. Omar Khayyam named the wine as "an old friend of man". Many nutritionists named wine as "a milk of old people". Platon said about this too: "A milk of old people". Recently, an experiment was held with the initiative of National institute of ageing of USA, in which 48 people participated and for six months drank a quarter less, than they need with standards of nutrition. As a result, a lot of changes happened in their organisms, which inhibited processes of ageing. But was proved by this day which not only diet with low calories activate "Longevity gene", but some natural products too. The most active is rasveratol contained in red wine. This is not only taste drink, but rich with useful materials as antioxidants, that`s why in the last few years all talk about the benefit of wine, especially about red wine. Even exists recommended dose for it, for men - 300 ml and for women - 150 ml daily. The healing properties of wine are well-known for many years. The Greeks used the wine as antiseptic, and the Romans claimed that wine isn`t only stimulates appetite, but also improves dream. Hippokrat and Lui Paster described in their`s jobs about the medicinal properities of wines. As modern researches consider tempered use of wine make organism of man stronger and healthier. The main thing - not to overdo it. The French advise to drink one glass of red wine a day in order to be cheerful and health always. The French know, about what they say, because they are on the first place for the consumption of wine per capita of population. According to the Pasteur «the most healthful drink» which is consumed in reasonable quantities that only heals man.

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CHANGES IN TOTAL PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY OF SALVIA AND SIDERITIS SPECIES GROWN IN WILD AND CULTIVATED CONDITION

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Salvia and Sideritis species are the members of the Lamiaceae family. These species have been widely consumed as herbal tea and it's well known that they have high antioxidant potential. *Salvia fruticosa*, *Salvia tomentosa*, *Sideritis lycia* and *Sideritis libanotica* subsp. *linearis* plant samples were maintained under cultivation and collected from three different locations around Antalya in flowering season of each plant. All samples were dried by natural convection until equilibrium moisture content. They were extracted with methanol solution (80%) and spectrophotometric methods were used to determine total phenolic content (mg GAE/ g dw), total flavonoid content (mg catechin/ g dw) and antioxidant activity (DPPH radical – scavenging activity estimated in IC50 values) of cultivated and wild plants. Total phenolic content, total flavonoid content and IC50 values of the plants were determined between 8.20-53.02, 10.08-53.73, 11.54-1.45 for wild and 10.80-61.10, 6.46-41.37, 12.18-2.44 for cultivated conditions, respectively. Results reflected that generally growing condition had significant effect on the analyzing parameters. It was determined that the cultivated plants had significantly higher values in total phenolic content. On the contrary in wild plants, total flavonoid and antioxidant activity were higher than those of cultivated plants except *S. fruticosa*.

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DEVELOPMENT OF NATURAL COMPONENT-BASED UNIQUE FUNCTIONAL FOODSTUFFS BY APPLYING SPECIFIC PROCEDURES INCREASING POSITIVE BIOLOGICAL IMPACT

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Market of functional foodstuff displays rapid growth recently. EGERFOOD RKC develops and introduces such specific, health-promoting foodstuffs of guaranteed positive effect containing bioactive agents. New, efficient technologies are also elaborated in order to preserve the maximum biological effect of the produced foods. Our studies aiming at elaboration of antioxidant-rich and prebiotic foodstuff extend to application of amino acids, vitamins and microelements, fructans. The developed inu-biscuit is an inulin-containing functional biscuit with pronounced prebiotic impact. Applicaton of novel analytical and microbiological methods aimed at revealing of both heat degradation pathway and the exact prebiotic impact of inulin. Dependancy of microbiological activity on the time-interval of thermal treatment was examined in cases of E. coli, Bifidobacterium and Enterococcus. Comparison of distinctive extraction and sample preparation protocols has been performed. Inulin was acquired from Chicorium intybus L. (chicory), Dahlia species (dahlia), Helianthus tuberosus (Jerusalem artichoke), and the samples were treated at 8 different temperatures for 9 distinctive time periods. Thermal treatments were carried out from 150°C up to 230°C. Mapping of the thermal degradation of the inulin was accomplished by means of HPLC-ELS-MS technique. Oligo-, and polymers deriving from inulin's heat degradation were isolated ranging from DP3 up to DP31.

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EVALUATION OF ANTIOXIDANT CAPACITY, TOTAL PHENOLS AND ANTHOCYANINS DURING THE ELABORATION PROCESS OF STRAWBERRY VINEGARS

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Strawberry is a widely researched fruit due to its nutritional and healthy benefits, mainly related with its phenolic composition (flavonoids, phenolic acids and anthocyanidins), in addition to its organoleptic properties. Spain is the second producer in the world and, every year, part of this crop is discarded due to several reasons. We used surpluses of this fruit to produce strawberry healthy vinegars. Furthermore, we measured the antioxidant capacity (ORAC and DPPH), Total Phenols Index (TPI) and Total Anthocyanins (TA) in strawberry purees, wines and seasonings to evaluate the effects of the double fermentation. Previously, to carry out these determinations an extraction method was optimized. Finally, our vinegars were compared with other commercial ones. Some of the results showed that: The addition of pectolytic enzymes and sulphur dioxide increased the antioxidant activity, TPI and TA. Products from alcoholic inoculated fermentation had higher values for antioxidant activity and TA than spontaneous ones. Seasonings pasteurization increased the antioxidant capacity. All the parameters measured decreased during the double fermentation process. We concluded that our strawberry vinegars could be an interesting healthy product competitive in the commercial market.

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ANTIMICROBIAL AND ANTIOXIDANT ACTIVITIES POLYPHENOLIC EXTRACTS FROM TUNISIAN *OPUNCIA FICUS-INDICA* TRADITIONAL SYRUP

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Opuntia ficus-indica (L.) is a tree-like cactus belonging to the Cactaceae family. The fruit (prickly pear) is sweet and juicy, and rich in nutritional compounds. The increasing interest of nutritional and pharmacological power of *O. ficus-indica* by products, particularly at industrial level, had motivated us to investigate the chemical content of the traditionally-prepared syrup, known in Tunisia as "Robb". Total polyphenolic compounds were firstly evaluated using the Folin–Ciocalteu method. High-performance liquid chromatography-diode array detection coupled to electrospray ionization-mass spectrometry (LC-DAD ESI-MS) was used to identify the polyphenolic compounds in the syrup. Our results showed that the total polyphenolic content of the Tunisien *O. ficus-indica* syrup was about 1122 ±143mg Gallic acid equivalent (GAE)/100 g of fresh material. The extract was found to exhibit strong antioxidant properties (181±6 mg Trolox equivalent per 100 g fw) using DPPH method. Moreover, The antimicrobial potential of the syrup extract against Gram+ *Staphylococcus aureus*, *Staphylococcus epidermidis* and *Bacillus cereus* and Gram- *Pseudomenas aerogenosa*, *Escherchia coli* and a *Salmonella* strain showed that the Gram+ were more sensitive than Gram- bacteria. *S. aureus* and S. *epidermidis* were the most sensitive strains.

Keywords: Antibacterial, Antioxidant, ESI-MS, Polyphenols, RP-HPLC.

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SURVIVAL RATE OF FREE AND ENCAPSULATED LACTOBACILLUS ACIDOPHILUS IN IRANIAN WHITE CHEESE

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Microencapsulation of probiotic cells is one the newest method which increases probiotics survival in probiotic food products. The aim of this study was to investigate the survival rate of free and microencapsulated lactobacillus acidophilus (La5) by calcium alginate and resistant starch in Iranian white chesses during manufacture and storage time. Two types of probiotic cheese, with free and microencapsulated bacteria, were manufactured in a same situation. Then survivability of the L.a was surveyed during 180 days at 5°C as comparative per gram of Iranian white cheese (CFU gr-1). For this purpose, live cells count in cheese samples (CFU gr-1) was determined at time 0 and during 180 days with two weeks interval. In this study extrusion method was performed for microencapsulation process. On first day average count of free L.a was lower than microencapsulated one, and in day of 28, free bacteria count was in higher level. then there was significantly decrease ($P<0.05$) in both bacterial count from 28 to 180 days, but free bacterial reduction was significantly higher than microencapsulated bacterial.

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EFFECT OF PRESSURE HOMOGENIZATION ON PHENOLIC CHARACTERIZATION AND ANTIOXIDANT CAPACITY OF VACUUM IMPREGNATED APPLE SLICES WITH CITRUS JUICE: A NOVEL FUNCTIONAL FOOD

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Vacuum impregnation has been described as a technique that allows the incorporation of any ingredient in a food porous structure, in order to improve its sensorial and/or functional properties. The impregnat of apple slices with citrus juice can allow to obtain a novel food with a high phenolic content and an important antioxidant capacity wich will be considered as functional food. The impregnation process can be affected by the pressure of homogenization which has undergone the juice. In this sense the aim of this work was to study the influence of pressure homogenization of the juice in the phenolic composition and antioxidant capacity of impregnated apple slices. Apples (Granny Smith variety) slices were impregnated with citrus juice (Ortanique variety) (no homogenized and homogenized at 30MPa). Phenolic compounds were isolated by SPE method and analyzed by HPLC. Antioxidant capacity (ABTS) and global phenolic content (TP) were also determined. The results indicated an increase in antioxidant capacity and phenolic content of impregnated apples with citrus juice. In addition, the pressure of homogenization of the juice significantly affected the global and detailed phenolic composition of slices, but these differences were not observed in its potential antioxidant effect.

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VOLATILE PROFILE OF SOURDOUGH BREAD MADE WITH KEFIR GRAINS

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Consumer's demand for reducing the use of preservatives, has led the last decades to the use of proper sourdough preparations as an additive-free method using new starter cultures. The present research survey is focusing in the application of kefir grains in sourdough bread making regarding volatile compound composition. Microorganisms composing kefir microflora are mostly yeasts, lactic acid bacteria, lactococci and occasionally acetic acid bacteria. The microbial composition of kefir grains is very attractive in sourdough bread making where lactic acid bacteria and yeasts function the main role. Solid-phase microextraction (SPME) GC-MS analysis was employed and the obtained results were further co-evaluated with additional findings of consumer oriented sensory tests. Breads were made with 20% w/w and 10% w/w (on flour basis) kefir sourdough, and were compared with breads made with 20% w/w commercial sourdough. Kefir sourdough breads exhibited more complex profiles of volatiles and had a firmer texture, better aroma, flavor and overall quality compared to other sourdough breads examined in this study, as shown by sensory evaluation tests, which revealed significant differences among the different bread types.

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THE EFFECTS OF HYDROCOLLOID USAGE ON CHEMICAL COMPOSITION AND SENSORY QUALITY OF TURKISH CHEESE HALVA; HOSMERIM

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"Cheese Halva" (Höşmerim) is a popular Turkish dessert composed mainly of unsalted fresh cheese. Master's experience and additives are among the factors that affect the quality of production. It is made with fresh salt-free cheese, sugar, egg, flour and/or semolina. It has a specific flavour and a high nutritional value because of its carbohydrate, fat, protein, mineral and vitamin contents. Generally, its production happens in pastry or other related dessert shops. The sugar syrup separation from the emulsion is a significant problem in the commercial hösmerim production.The aim of this study to determine that different hydrocolloids affect on the hosmerim texture. Three different type of halva are produced by changing the using hydrocolloids (inülin, lecithin and agar agar) ratio. They were kept both in enviromental (approximately 25 °C) and refrigeration (5 °C) conditions for detection of their quality characteristics. Also some chemical analysis like total dry matter, protein, fat, sugar and ash contents were made for each type of halva. With results obtained from sensory evaluations, quality criterias, preferences and shelf life for each type of cheese halva is determined.

Keywords: Hosmerim, cheese halva, hydrocolloids, lecithin, agar agar, inülin.

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DEVELOPMENT AND INTRODUCTION OF DIETARY SUPPLEMENT TABLET AND TEA BY UTILIZING PURPLE CORN AS NATURAL ANTIOXIDANT RESOURCE

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Natural colorant materials have gained growing interest, because of the wide color range and proved beneficial health effects inducing applications in pharmaceutical and food industries. Anthocyanins belong to this family with a broad occurrence in fruits and vegetables and a high rate of antioxidant, anti-mutagenic and anti cancer activities being indispensable for well-argumented and purposive functional food development. One important source of plant anthocyanins is purple corn (Zea mays L.) originated from Latin America. The subject of our studies was to develop and characterize a dietary supplement tablet and a tea produced from the red colored cob of puple corn. After applying the optimized, improved extraction method, the obtained solution was filtered and the solutions were subjected to the determination of antioxidant activity by FRAP and DPPH methods, the anthocyanin content was determined by HPLC-DAD-MS. Cyanidin, peonidin and pelargonidin derivatives have been identified in the corn samples. Around 5 mg/g total anthocyanin content have been established, the ratio of the specific antioxidants has also been determined. The antioxidant capacity of the tablet was 300mg/g in ascorbic acid units. The dietary supplement tablet and tea contain high amount of culinary fibers as well and already available in commerce.

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OLIGO-PEPTIDE DERIVATIVES AS PERSPECTIVE FUNCTIONAL FOOD COMPONENTS, DETECTION AND STABILITY

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Small molecular weight peptides represent an important family of compounds that play significant role in physiological and biochemical processes as well as in clinical and food research. The functional properties of these compounds can include antioxidant and antimicrobial activity, surfactant and nutritional capabilities. Several publications have dealt with the separation, detection and identification of these peptides, however the published methods carry difficulties in terms of the quantitative analysis, and the sensitivity and reproducibility have been proven to be poor mainly because several amino acid moieties have low UV-absorbing properties. Our intention was to develop a reliable and sensitive HPLC chromatographic method to detect di-, and tripeptides in raw and processed food materials. Pea, rice and garlic samples have been selected for the study, the extraction procedure was optimized with different solvents. Antioxidant activity (FRAP) was observed only for the sulfur containing derivatives. Garlic extracts have shown the highest antioxidant activity (46 ppm in ascorbic acid equivalents), pea samples have exhibited lower activity (23 ppm) and the lowest activity has been measured for rice samples (19 ppm). The peptide content was varied in the 10-100 ppm region for all derivatives in the examined plant parts.

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VERIFICATION OF AN ANALYTICAL METHOD FOR DETERMINING SOME ARTIFICIAL SWEETENERS USED IN THE FOOD INDUSTRY

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A new reverse-phase, gradient, HPLC method was developed for simultaneous determination of aspartame, acesulfame K, Na saccharin, including phenylalanine, in different food products. The separation was obtained on Supelcosil 150x4.6, (0.1M NaH_2PO_4, pH= 2.5 and acetonitrile), T=26°C, F=1.5ml/min. Depending on the structure of the food, different extraction methods were applied. This method is also applicable for simultaneous determination of caffeine, teobromin and Na benzoate. The method was validated. The study was performed at the Institute of Public Health, Skopje (2005- 2006). The results are summarized for 133 different food products and were estimated irregularity in 21% of the products, of which 50% were imported. Of the domestic products, 21% exceeded the maximum permitted quantities of sweeteners and the remaining products had irregular labeling. Intake of artificial sweeteners was estimated according to the mean body weight for children, adolescents and adults, under supposition that the products contained the maximum permitted quantities. Only in such cases, the calculated (TMDI) of any sweetener in food products, for all groups of population, indicate the existence of potential healthy risk in the youngest population that permanently take "large" quantities of artificial sweeteners.

Keywords: aspartame, acesulfame K, Na saccharin, HPLC method, validation, estimation of intake

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NEW DEVELOPMENTS IN THE SYNTHESIS OF REDUCED CALORIE FATS

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Fats and oils are the main components of human nutrition and the main energy sources of the human. However, high fat intake causes degenerative diseases, heart diseases, high blood pressure, diabetes, cholesterol and cancer. A market for reduced calorie fats and fat replacers has opened with increasing consumer awareness of the risks associated with high fat intake. Fat replacers based on carbohydrates and proteins are alternatives to the reduced calorie fats but they are suitable for low temperatures, not suitable for cooking and frying temperatures. Structured lipids (SL) are triacylglycerols that contain mixtures of either short or medium chain fatty acids and long chain fatty acids, esterified preferably on the same glycerol molecule. Based on their benefits to human nutrition, several reduced calorie fats have been developed and designed in enzymatic methods. The purpose of this paper is to present the latest developments in the synthesis of reduced calorie triacylglycerols by enzymatic methods and to investigate properties of them.

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A COMPARISON OF SELECTED VALUABLE COMPONENTS IN TRADITIONAL "SOYMILK" AND COW MILK

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"Soymilk" represents a traditional beverage made from soybeans [Glycine max (L.) Merr.] and has become by and by an important factor in human nutrition throughout the western world. The composition of "soymilk" is different from bovine milk in many aspects. The major objective of this study was to establish an appropriate methodology to determine the fatty acid profiles, fat, protein as well as soluble sugar content and moreover phyto-estrogens (isoflavones) of "soymilk" and cow milk. Concerning the fatty acid profiles, "soymilk" was rich in omega-3-fatty acids, whereas short-chained fatty acids were not present, but were found in cow milk. The main result for the fat content was that bovine milk showed a higher content than "soymilk". Both products differed in their intrinsic protein yield. Cow milk had a content of approximately 3.5%, while "soymilk" contained around 4.8% protein. For soluble sugars, sucrose represented the main component in "soymilk", but was not present in cow milk. Regarding phyto-estrogens, about 40 mg/100 g were found in "soymilk". In general, "soymilk" turned out to be a valuable alternative food and may be contemplated as a promising option for lactose intolerance people. However, taking into account recent literature, "soymilk" can definitively not be considered as an adequate substitute for bovine milk, especially for young children.

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PROCESSING TECHNOLOGY OF AJVAR, LUTENICA AND GUVEC

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During 2009, at the factory for processing of fruit and vegetables "Zora Sped", Gevgelija, were made examinations on following preserved vegetable products: ajvar, lutenica and guvec. With applying a procedure of pasteurization was produced ajvar, using as raw materials sweet pepper from different variety: Kurtovska kapija, White kapija and "Shatirana" pepper, eggplant, salt, sugar, vinegar and oil. For the preserved product lutenica, as a raw material, beside sweet pepper, were used hot pepper, carrots, garlic, salt, sugar, tomato souse, parsley, vinegar, oil and spices. Guvec as a sterilized product was produced as a mixture of different vegetables: sweet pepper Sivrija, Green kapija and Kurtovska kapija, eggplant, onion, carrot, oil, tomato souse, parsley and salt. The analyzed types of products were controlled for the parameters of quality with estimation of the sensory and chemical properties. Sensory panel analysis was made with a grade of scoring 1-5. According to this assessment, the highest score of 4.5 had lutenica for their smell, ajvar had the highest score 4.37 for color and 4.81 for taste. All products had the same result for texture 4.56. Analyzing the chemical parameters were determined the highest content on dry matter (13.65%) and the highest content of total acids (1.19%) for the product lutenica and the highest content of salt (1.67%) was determined in ajvar. The values for quality parameters specified in the analyzed products are within the acceptable values with the Macedonian regulations for these types of product.

Keywords: ajvar, guvec, lutenica, sensory analysis, quality control.

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BIOTALKAN

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Modern medicine today turns to nature, to the arsenal of therapeutic products of preventive nutrition. From immemorial time wise Kazakh people during the "Nauryz" festivities served their guests with a splendid dish of germinated grains that embodying life, sunshine, health, peace. Scientists from Almaty Technological University have developed such natural domestic products as talkan with optimally selected composition. It is made of environmentally friendly raw materials which have received special treatment with preservation of biologically active substances. The new species of talkan, the biotalkan is made of germinated grain, basically corn. Sprouted grain is healthier than normal "sleeping" grains in what concerns its biological composition. The distinctive feature of the product is that in its manufacture and application high temperatures are not used, so it retains the all natural elements, but the use of biotalkan provides maximum healing effects, due to the addition of a food of plant origin with a high content of biologically valuable substances. Natural product made from selected seeds by special technology containing food fiber (cellulose), a complex of active enzymes, vitamins A, C, B (B1, B2, B6), biotin, proteins, amino acids, carbohydrates, oxygen, trace elements (zinc , iron, calcium, phosphorus, copper, magnesium). Having this product in the morning reduces sugar rate in the blood, peristalsis, eliminates bacteria overgrowth and other decay processes, cholesterol excess, cleanses the liver and gall bladder.

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ON THE FORMULATION DESIGN AND RHEOLOGICAL EVALUATIONS OF PECTIN-BASED FUNCTIONAL GELS

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Development of a novel pectin-based functional gel was investigated using amidated low methoxyl pectin (ALMP), high methoxyl pectin (HMP), sorbitol, inulin, stevioside, gardenia, phloridzin, quercetin, apple flavor and calcium chloride as general ingredients. The oscillatory tests were carried out in two stages. Results of the first stage indicated relatively similar behaviors throughout the frequency range applied. However, magnitudes of the five rheological parameters of this study were affected by different variables. Experimental results confirmed that presence of sorbitol is not crucial for the above gel formulas. However, inulin and HMP could be used at their highest levels studied here. At the second stage, only two formulas indicated strong gel behaviors and other formulas showed typical behaviors of weaker gels or those of concentrated solutions. At the end of this study, a formula for the final gelled product was suggested by incorporating the following ingredients: ALMP (1.25%, w/v), HMP (2.00%), inulin (3.00%), phloridzin (0.02%), quercetin (0.02%), stevioside (rebaudioside-A) (0.10%), gardenia (0.05%), apple flavor (0.10%) and calcium chloride as dihydrated salt (0.12%). The resultant gel was found to be set rapidly with no syneresis. The final product showed a potential to be considered as a functional gelled dessert.

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PRODUCTION OF CHONDROITIN SULFATE FROM DUCK TRACHEA

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Duck trachea is a part of poultry processing waste containing cartilage as a main composition. Cartilage is known to comprise of chondroitin sulfate (CS), a well known neutraceutical substance for osteoarthritis healing. This work aimed to study the production of CS from duck trachea as an alternative for swine and bovine sources. Effect of alkaline (0.05-0.1MNaOH at 4°C and RT for 1-6h), enzymatic (0.1-0.5% alcalase, 1-6h) and heat (boiling at 1-120 min) treatments on CS loss was investigated. The cartilage digestion (0.0625-1.0%papain for 1-10h) was performed to evaluate yield, type and size (by electrophoresis) of CS. To determine CS content and type, CS obtained from papain digestion were depolymerized by chondroitinase ABC. The disaccharide composition and content were then analyzed by HPLC using a Hypersil SAX column. Duck trachea comprised of 73.05±3.31% cartilage proportion, and 3.464±0.154%CS (dry basis). The chromatograms show that CS of duck trachea contained more ΔDi-4S than ΔDi-6S and ΔDi-0S with ΔDi-4S/ΔDi-6S+ΔDi-diSs ratio above 1 which is a unique characteristic of CS from land animal. The alkaline treatment caused up to 50% loss of CS when only 11% loss was observed after 120 min boiling. The electrophoretic pattern of CS from duck trachea using 0.0625-0.25% papain digestion for 1-10h were similar in size (15-40 KDa). Up to 80% of CS was extracted by 0.25% papain digestion for 10h. Boiling is suitable for removal of other components from duck trachea and 0.25% papain could efficiently digest CS from duck cartilage.

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QUALITY PROFILE OF PALM SUGAR CONCENTRATE PRODUCED IN THAILAND

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Quality of palm sugar concentrate produced in Thailand in terms of physical, chemical and microbiological aspects was determined. Palm sugar concentrates possessed wide range of turbidity and colour shades. Transmittance values at 650 nm were found to vary between 1.34-50.45 % and L* (Lightness) varied between 1.78-53.93, a* (red colour intensity) varied between 9.87-34.75 and b* (yellow colour intensity) varied between 3.09-78.94. Total soluble solid contents of the samples varied from 59.01 to 73.05 °Brix and were likely related to a variation of total microbial count ($1.20x10^3$-$4.80x10^6$ cfu/ml), yeast and mold count ($1.30x10^2$-$5.30x10^4$ cfu/ml) and osmophillic yeast count ($2.00x10^2$-$1.46x10^5$ cfu/ml). Total microbial counts of the product moderately positively correlated with L*, b* and transmittance value, whereas slightly negative correlated with total acidity (as lactic acid), reducing sugar content and osmophillic yeast count. The microbiological quality of all samples did not comply with Thai legislation standard for palm sugar concentrate and the content of total soluble solids of 7 in 30 samples were not in line with the requirements either. Different quality of palm sugar concentrate might be due to the differences in personal hygiene, sanitary facilities, heating processes and storage conditions.

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ASSESSMENT OF BIOLOGICALLY BENEFICIAL COMPONENTS OF ANTIOXIDANT RICH EXTRACTS OF VARIOUS NATURAL RESOURCES

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There is an increasing interest in the substitution of synthetic food additives, colorants and antioxidants by natural ones. Anthocyanins contribute to the intense colors of berries, cherries and other fruits and vegetables. The most common anthocyanidins present in higher plants are cyanidin, delphinidin, malvidin, pelargonidin, peonidin and petunidin. Anthocyanins accounts to several hundreds in total, are glycosides of glucose, rhamnose, galactose or other monosaccharides and combinations there of. Our intention was to identify the detectable major and minor natural compounds in fruits and vegetables, establish their unique ratios, as well as perform comparative studies on their antioxidant capabilities, and point out the suitability for potential application in functional food developments. Seven plants were selected for this study, including blackberry, black elderberry, black currant, Szomolyai sweet cherry, rosehip, pumpkin, and horseradish. The content of individual and total anthocyanins in extracts were analyzed by HPLC-MS. Antioxidant capacity of the compounds were established by using DPPH and FRAP methods The aim of this study was to identify major and minor bioactive compounds from different fruits and vegetables, as well as determining their abundance and ratios. The active component content varied between 0-10 mg/g depending on the used extraction solvents.

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THE BIOCHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS OF KARGI TULUM CHEESE

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Tulum cheese is generally manufactured from raw milk following different processing methods related to the production area. Kargı Tulum Cheese is manufactured as an organic food in the high plateau of Kargı, Çorum where it is placed in the Middle Anatolian region of Turkey. It is manufactured in summer months and marketed in public bazaars in autumn. During ripening period, non starter lactic acid bacteria and natural contaminating microorganisms grow and affect the biochemical and microbiological properties of cheese. In the study, nine cheese samples ripened six months were obtained from 3 different traditional manufacturer of public bazaar in Kargı, Çorum. The cheeses were manufactured from cows' milk, the mixture of sheeps' and cows' milk and the mixture of buffalos' and cows' milk depending on the manufacturer resources. The contents of total solids, fat, protein, lactic acid and salt were changed between the 61.91-70.34 %, 17.83-22.83 %, 20.81-22.09 %, 0.44-0.79 % and 3.04-4.37 %, respectively, in the samples. The tyrosine contents were lower in cheeses produced from the mixture of cow and sheep milk. The cheeses had a similar count of lactobacilli and lactococci while the yeast and mould counts were higher in the samples produced from cows' milk. Free fatty acids content was also higher in those cheese samples.

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THE FUNCTIONAL AND HEALTH EFFECTS OF A DIETARY FIBER: INULIN

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Inulin is a term applied to a heterogeneous blend of fructose polymers which contains β-(2→1) fructosyl-fructose linkages with a terminal glucose. It is found widely distributed in nature as plant storage carbohydrates and contains between two and sixty fructose residues, with an average of twelve. Partial enzymatic hydrolysis of inulin yields a fructooligosaccharide known as oligofructose, which can have a terminal glucose or fructose residue. Inulin is a functional food ingredient that improves technological properties, as a low-calorie sweetener, as a fat substitute, or as a texture modifier. Furthermore, it provides nutritional benefits, which results in better health, as a dietetic fiber and as a prebiotic ingredient. Inulin has neutral taste, is colorless, and thereby only minimally influences the organoleptic characteristics of product. The high solubility of inulin enables it to be fortified in dairy products such as milk drinks, yogurt, cheeses, and desserts. The ability of inulin to form cream when sheared in skim milk provides good mouth feel to the food to which it is incorporated. Studies have shown that inulin acts as a prebiotic, in promoting good digestive health, influencing lipid metabolism and decreasing risk of osteoporosis by increasing calcium absorption. Inulin is also found to exhibit some effect on insulinaemia and glycemia, as well as reduce the risk of colon cancer, breast cancer, and tumor growth.

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INFLUENCE OF ENVIRONMENTAL FACTORS ON D-PINITOL CONCENTRATION OF WILD TYPE CAROB PODS

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Legumes such as soybean and carob are rich sources of D-Pinitol, a low molecular carbohydrate lowering blood glucose levels. Approximately, 99% of total chiro-inositol (40.0 g/kg) in carob pod exists as pinitol. Recently, there has been commercial interest in providing cyclitols (such as D-Pinitol) as dietary supplements or as insulin substitutes. Since the demand for pinitol as a food supplement or pharmaceutical increases, to find plants naturally rich in this compound has become more important. Because carob is also known rich in the amount of this component, this present study aimed to determine the effects on influencing the pinitol concentration in wild type carob pods grown in Turkey. For this purpose, pomological analyses (measurement of length, width, thickness, pod weight, kernel weight and kernel number) were performed. Pinitol concentrations, determined by HPLC analysis, were compared with chlorophyll density and pomological properties. Results were indicated that D-Pinitol content of wild carob types was changeable according to the environmental factors. D-Pinitol content mean of the samples of first year was 40.32±21.73 g/kg dry weight whereas in the second year this value was found 50.76±10.08g/kg dry weight.

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USE OF DIFFERENT LACTIC STARTER CULTURES IN THE PRODUCTION OF TARHANA

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In this study, L. plantarum and L.brevis were used as starter cultures in tarhana production. Chemical compositions of samples did not differ significantly. The L. plantarum added sample (P) and L.brevis added sample (B) had lower acidity values than the control sample (C). Total antioxidant capacity and total phenol contents were not significantly different during the production days of 1-4. According to protein in-vitro digestibility results, sample B had lower values than sample C and, all the samples had generally higher values in the 3rd day of fermentation. Samples were analysed for total aerobic mesophilic bacteria, total lactic acid bacteria, total coliform group bacteria, E.coli, S.aureus and yeast-mould counts. In the fermentation period, sample P had the highest counts of lactic acid bacteria and, sample B and P had higher values of total aerobic mesophilic bacteria and yeast- mould counts with respect to sample C. Sample type had no significant effect on the microbiological load of the last dried products where the microbial count results were significantly lower compared with those in the fermentation period. The evaluated data displayed both the alterations during tarhana fermentation and the effect of starter cultures on these parameters.

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MANUFACTURE OF ZINC-FORTIFIED DAIRY PRODUCTS WITH SELECTED MULTI- AND MIXED-STRAIN STARTER CULTURES

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Zinc is the second most abundant d-block metal in the human body after iron. It is necessary for numerous physiological processes. Zinc deficiency may develop rapidly if intakes are low since the human body has a limited capacity of storing zinc. Consumption of zinc-fortified foods substantially increases zinc intake. The main aim of the present study was to manufacture zinc-fortified dairy products, namely yogurt and two traditional Italian fresh cheeses, Squacquerone and Caciotta with selected multi- and mixed-strain starter cultures. Yogurt is an ideal vehicle for zinc supplementation due to its widespread consumer acceptance, whereas Squacquerone and Caciotta are attractive products for risk groups who typically consume fresh cheeses. In order to achieve our goal, three zinc salts, namely Zn-gluconate, Zn-sulphate and Zn-aspartate and starter cultures including selected strains of Streptococcus thermophilus, Lactobacillus delbrueckii ssp. bulgaricus and Lb. helveticus were used for cheese-making trials. The first two zinc salts are allowed for food supplementation by Regulation (CE) N. 1925/2006, whereas the latter is not allowed yet, although its dietary supplementation at the proposed use level of 50 mg/day and 0.8 mg/Kg bw/day is not of safety concern according to the European Food Safety Authority (EFSA). Both the experimental zinc-fortified batches and the control dairy products were subjected to physico-chemical, compositional, microbiological and sensory analyses. The experimental results were finally analyzed statistically by ANOVA, in order to establish significant ($P > 0.05$) differences between control and Zn-reinforced dairy products.

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FORMULA OPTIMIZATION OF GLUTEN FREE CAKE WITH CHESTNUT FLOUR

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Gluten, as a functional protein, exists in wheat and some other grains such as barley, rye and oat. Gliadin fraction of gluten cannot be digested by some people and causes celiac disease. Removal of gluten from the formula in bakery products causes quality problems. Therefore, there is a need for alternative components and determination of their functions to stimulate the functionality of gluten. In this study, the possibility of usage of chestnut flour in gluten-free cake production was investigated. When chestnut flour was used alone, acceptable cake quality could not be obtained. Therefore, potato starch was added formula in order to take advantage of the functional properties of potato starch. Response Surface Methodology (RSM) was used to obtain the rate of water absorption, gum mixture and potato starch in the chestnut formula. The basic components (shortening, sugar, baking powder, non-fat milk powder, egg white powder) were kept constant in the study. Gluten-free chestnut cake and control wheat flour cake were compared in terms of physical, sensorial and textural attributes. Acceptable results, compared to the standard cake were obtained with 0.225% xanthan gum, 0.075% guar gum (fwb), chestnut flour- potato starch at the ratio of 7:3.

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STUDY ON THE FUNCTIONAL CHARACTERISTICS OF SIEVED IRANIAN CANOLA MEAL (BRASSCIA NAPUS) WITH AIM OF USING IN THE FEED AND FOOD. I: FIBER COMPOSITION

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The Iranian Government has focused on the production of canola in a 10-year project. Canola meal has invaluable protein content in food and feed. High quantity of Non Starch Polysaccharides (NSP) is one of the most important limiting factors to use. Screening experiment was designed to determine the suitable products in viewpoint of recovery percentage and gross cost. Cellulose, hemi cellulose, total NSP (soluble and insoluble) with constituents' sugars of three selected products of the first stage was quantified. The results showed that with increasing of mesh number, recovery percentage significantly decreased but gross cost increased. To select the most efficient mesh number among the selected products obtained from sieves of 16, 18 and 20, chemical composition was done. Although there is no significant difference among protein content of sieved products, but the value of protein unit increased significantly. The mean content of insoluble NSP was 85.1 % of canola meal weight. After glucose and arabinose, galacturonic acid had the highest content in the insoluble part. Arabinose and galactose included the highest content in soluble part. The mesh number 16 was selected for following experiments. Results showed that insoluble NSP was the highest part of fiber compounds in canola meal.

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COMPARISON OF SOY CAKES BAKED IN HALOGEN LAMP AND MICROWAVE COMBINATION OVEN AND CONVENTIONAL OVEN IN TERMS OF QUALITY PARAMETERS

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In this study it was aimed to determine the variation of quality parameters of soy cakes baked in halogen lamp-microwave combination oven and conventional oven. The sample cakes examined were prepared by mixing wheat flour and soy flour with a certain percentage (50%). Soy beans are very rich in terms of protein content and also it is a functional food. It has beneficial effects on nutrition. The cakes were baked in combination oven for three different times (8, 9 and 10 min). For the halogen lamp-microwave combination baking, the power levels of the upper (1500 W) and lower (1500 W) halogen lamps (IR source) were adjusted to 50%, and the microwave power of 50% were used. Similarly three different baking times (32.5, 35 and 37.5 min) were employed in conventional oven at 175 C. The quality parameters which were examined were volume, texture and color of sample cakes. The specific volume, ΔE and hardness data of combination baked cakes were 1.00-1.18 ml/g, 58-69 and 0.16-0,19 kgf respectively whereas those of conventional baked samples were 0.79-0.98 ml/g, 58.5-60.0 and 0.07-0.09 kgf. It was concluded that baking soy cakes in combination oven is very advantageous due to low baking times and good quality properties which are comparable to conventionally baked soy cakes.

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EVALUATION OF THE CHANGES OF COLOR PARAMETERS FOR SUMAC CONCENTRATES

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Sumac is known as any shrub or tree of the genus Rhus(family Anacardiacea) . Sumac is a very popular in Turkey, and in the Middle East and in some European coountries where the ground fruits are liberally sprinkled over rice. The juice extracted from sumac named as "sumac concentrate" is popular in salad dressings. Sumac contains certain amount of anthocyanins which give red color. In this study the effect of thermal processing on the Hunter color values of sumac concentrate were studied. Color changes of sumac extracts at different concentrations for different temperatures were studied. The evaluation of the Hunter color parameters (L, a, and b values) with the time were applied to zero- and first-order models. All color parameters showed similar behavior for fittings. Also, the effect of temperature on the color values of sumac concentrate was investigated and concluded as; the rates of change of color parameters increased as the heating temperature became higher by the concentration increase.

Keywords: Sumac concentrates, color changes, Hunter values, thermal processing

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ANIMAL MILK BUTTER-A REVIEW ON ITS COMPOSITION AND THE USED ANALYTICAL TECHNIQUES FOR THE FATTY ACIDS AND VOLATILE COMPOUNDS PROFILE DETERMINATION

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Animal milk butter, is a dairy product with an important role in the diet of the people in Mediterranean basin and worldwide. It is used as a spread in breakfasts and as cooking stuff and raw material in many sectors of the Food Industry and catering. Major part of its composition are lipids including bioactive ω-3 and ω-6 fatty acids and minor but important are the contained volatile aroma constituents. The content of these compounds is reported by the literature to be dependent on many parameters including season, the nature of animal nutrition, the altitude where the milk producing animals are kept, the animal race e.t.c. For the fatty acids and aroma profile of the butter several analytical techniques have been developed in order to determined, on both qualitative and quantitative basis, and extract useful conclusions on how this can be improved. The present work is a comprehensive review on the product composition and the available modern analytical techniques established to determine the fatty acids and aroma profiles of animal milk butter and the presented information was collected to serve an ongoing research for detailed mapping of quantitative variation of bioactive and aroma compounds in milk butters around Greece.

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RASPBERRY AS A FUNCTIONAL INGREDIENT IN GLUTEN-FREE CAKE PRODUCTION

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In the study, raspberry fruits naturally grown in Sarıkamış, Kars was used at different rates (0, 5, 15, 25%, fwb) in chestnut flour-based gluten-free cake formula. Control cake and experimental cakes including raspberry were compared in the term of antioxidant activity and total phenolic compounds. Antioxidant capacities of both cake samples were determined by using DPPH radical scavenging capacity assay. Total phenolic content (TPC) were determined by using Folin-Ciocalteu method and expressed as gallic acid equivalent (GAE) of g extract. For raspberry extract, DPPH values is 92% and total phenolic content as 5.76 μg GAE/g extract were found. DPPH value of experimental cakes including (0, 5, 15, 25% fruit) were 68, 84, 85, 86%, respectively. TPC values were found as 0.85, 2.63, 2.74, 3.05 μg GAE/g extract. TPC values of raspberry added cakes are 3-4 times higher than the control cake. The use of raspberry fruit in gluten-free cake production significantly increased antioxidant activity and the content of phenolic compounds of the gluten-free cake.

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DETERMINATION THE D-PINITOL CONTENT OF CULTIVATED CAROB TYPES

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D-pinitol (3-O-methyl D-chiro-inositol) is such a compound that has been discovered an insulin-like effect on blood glucose levels in human metabolism. An anti-inflammatory effect of this cyclic sugar alcohol is also demonstrated with in vivo studies. Recently, a new trend has been developed to isolate this functional material from food stuffs rich in this content. Especially, D-pinitol is isolated by using soybean but carob can also be another alternative because of being in the same family (Leguminasae) with soybean. Therefore, the aim of this study was to determine the D-pinitol content of cultivated carob types (Ceratonia siliqua L.) grown in the Mediterranean region of Turkey. D-pinitol concentrations of samples were detected by RP-HPLC and found to have been varied between 28.40±6.99 and 52.2014.74 g/kg dry weight.

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PHYTOSTEROLS AS FUNCTIONAL FOOD INGREDIENTS

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Phytosterols defined as plant sterols and plant stanols, have lowering effect on total and LDL blood cholesterol by preventing cholesterol absorption from the intestine, so they have been known as blood cholesterol-lowering agents for over the last half century. Plant sterols might also protect against certain types of cancer such as colon, breast and prostate. Phytosterols are naturally found in vegetable products, principally oils. Dietary phytosterol intakes normally range from 170 to 360 mg/day with variations depending on food culture and major food sources. Recent studies have shown that maximum cholesterol-lowering benefits are achieved at doses of 2-3 g per day. Therefore today's use implies the need for enriched functional food products, which give enough phytosterols intake. The enrichment of foods such as margarines with phytosterols is one of the recent developments in functional foods to enhance the cholesterol-lowering ability of traditional food products. It is estimated that 2500 tons of vegetable oil needs to be refined to produce 1 ton of phytosterols. In the USA, plant sterols, stanols and their esters were given Generally Recognized as Safe (GRAS) status. In this review phytosterols as functional food ingredients and their benefits on health are reviewed.

Keywords: Phytosterol, plant sterol, plant stanol, diet

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KIRKLARELİ "HARDALİYE"

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Hardaliye is produced from purple grape juice and smashed purple grape. It is a fermentation process with the proper mixture of black mustard seed, potassium sorbate, sodium benzoate and sour cherry leaves. It has a specific taste, smell and it is non aliphatic nutritious drink. It is mixture is as fallows 100 kg purple grape, 800-1200 g smashed black and yellow mustard seed, 80-120 g K-sorbate or 50% Na-benzoate, 50% K-sorbate. Since there is no heating involved, some bacteria and fungi associated with purple grapes and sour cherry leaves, may always play role in fermentation. Dark colored grapes whit stray smells are preferred. Ripe grapes are gathered and smashed then they are put in the barrels or in stainless steel container and then they are left for fermentation. Then 5 to 10 cm thick smashed sour cherry leaves and smashed blade mustard seed and some K-sorbet, Na-benzoate. This process is repeated until the container is filled almost to the top (20 to 30 cm less then top). During this fermentation period, every day the container is drained from the bottom faucet and this juice is powered back to the container from top of it, in order to ensure some homogeneity. This fermentation which is kept at 20-22 °C and is last 20-30 days will produce raw "hardaliye". Then it is kept in container for another 15-20 days in order to achier some dirty. Then it is ready for bottling. It should be refrigerated and consumed in 4-6 months.

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GLYCAEMIC INDEX AND GLYCAEMIC LOAD OF FIBRE ENRICHED MALIBAN BRAN CRACKER

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The current focus of the food producers is on the production of healthy snacks enriched with dietary fibre with low glycaemic responses targeting the increasing diabetic and obese populations. The objectives of the study were to determine the glycaemic index (GI) and the glycaemic load (GL) of the fiber enriched (6.2%) Maliban cracker to produce a low GL snack package. The GI was determined according to the standard WHO criteria. Ethical clearance was obtained from the Ethics Committee, University of Sri Jayewardenepura. Healthy volunteers (n=30, 20-30 years, BMI:18.5-23) were recruited for the study. After an overnight fast a 50g available carbohydrate portion from the cracker and the standard, glucose (twice) were served to the same individual on separate occasions randomly. The GI was determined by comparing the incremental area under the curve of blood glucose response of the cracker to the standard and GL by multiplying the GI by carbohydrate portion in an actual edible portion. The GI of the cracker was 65±8 and was classified as a medium GI food. The GL for a 50g digestible carbohydrate portion (11 biscuits) was 33. For a normal edible portion of 2-3 biscuits the GL would be 6-9 (low GL<10). Thus consumption of 2-3 biscuits would give rise to a lower glycaemic response and could be recommended as a healthy snack for diabetics/obese or any individual.

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INVESTIGATION ON PLAUSIBLE REACTION PATHWAYS OF MAILLARD TRANSFORMATION OCCURRING IN NEWLY DEVELOPED ANTIOXIDANT RICH BAKERY PRODUCTS

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Due to the rapidly growing number of conscious customers in the recent years, people look for products with positive physiological effects which may contribute to the preservation of their health. In response to these demands we developed new functional foods with guaranteed positive health effect. The key point of the developed products is the production of compounds with high antioxidant-activity obtained by the reaction of carbohydrates and proteins. The object of the study was to acquire an extended pathway by the identification of the Maillard reaction products, generated during the baking processes. The antioxidant activity of these products were determined by FRAP and DPPH methods. Products of the Maillard reaction were analyzed with GC-MS and HPLC-MS. The chemical structures of more than 10 products, involving Shiff-base, Amadori-products and other melanoidines have been characterised. The transformation processes of saccharides and lysine have been revealed and a reaction pathway has been proposed by the attribution of the identified products. Most of them are responsible for the outstanding antioxidant activity of the bakery products. The revealed pathway gets us closer to find the technologically optimal processing temperature in order to make food products functional or more beneficial to promote our health.

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FUNCTIONAL FOODS DEVELOPMENT TO COMBAT METABOLIC SYNDROME

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Metabolic syndrome is a collection of heart disease risk factors that increase chance of developing heart disease, stroke and diabetes. The condition is also known by other names including Syndrome X, insulin resistance syndrome and dysmetabolic syndrome. According to a US National Health Survey, more than one in five Americans has metabolic syndrome. The number of people with metabolic syndrome increases with age, affecting more than 40 percent of people in their 60s and 70s. The American Heart Association (AHA) and the National Heart, Lung, and Blood Institute recommend that the metabolic syndrome be identified as the presence of three or more of these components: elevated waist circumference i.e. 35 inches (women) to 40 inches (men), triglycerides greater than 150 mg/dL, HDL less than 40mg/dL in men and 50mg/dL in women, blood pressure equal to or greater than 130/85 mm Hg and fasting glucose equal to or greater than 100 mg/dL. For managing both long- and short-term risk, lifestyle therapies are the first-line interventions to reduce the metabolic risk factors. Plant foods contain biologically active ingredients which have helpful in tackling metabolic syndrome. Functional foods can be developed by utilizing the biological active ingredients and can be incorporated in the daily diet to improve the common man health by combating the factors contributing toward the onset of metabolic syndrome.

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ADDITION OF CANOLA OIL TO DAIRY COW DIETS: EFFECTS ON FATTY ACID COMPOSITION OF MILK

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Canola is one of two cultivars of rapeseed or Brassica campestris (Brassica napus L. and B. campestris L.). Their seeds are used to produce edible oil that is fit for human consumption. The effects of ruminant diet supplementation with linoleic or different polyunsaturated fatty acids (FA) have been well documented. In this study Forty-two dairy cows were used to determine effects of feeding canola oil on milk fatty acids composition. Cows were divided into two groups: control or supplemented with 8% canola oil (2 lots of 6 animals per diet) for 4 weeks. Milk composition and dry matter intake were recorded weekly. Milk fatty acids composition was determined by gas chromatography. Milk yield increased in cows receiving canola oil, with no differences in dry matter intake. The canola oil diet decreased the milk protein percentage but increased the milk fat and protein. The main conjugated linoleic acid isomer (cis-9, trans-11 C18:2) decreased with canola oil supplementation, whereas trans-7, cis-9 and trans-9, cis-11 C18:2 exhibited a remarkable increase. These results support the argument that the supplementation of cows diets with low levels of canola oil is very effective on modifies the FA profile.

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DETECTION OF SOY AND GLUTEN IN FOODS USING ENZYME-LINKED IMMUNOSORBENT ASSAYS (ELISAs)

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Food allergies have become an important health issue. It is thought that around 1-4% of the population and 5-7% of infants suffer from food allergies. Although most food allergies cause relatively mild and minor symptoms, some food allergies can cause severe reactions and may even be life-threatening. The frequency and potential severity of reactions to foods are: gluten containing food (bread, cakes, some spices, etc.), soybean, cow's milk, egg, fish, crustaceans, peanuts and tree nuts. The purpose of this study was to determine the amount of soy in Turkish ravioli and meat products and amount of gluten in starch, some spices such as coriander, cumin, and gluten free cake by 'sandwich' enzyme immunoassay (ELISA). A total 15 samples for gluten analysis, 24 samples for soy analysis were collected. According to results, 8 of the Turkish ravioli were negative for soy. All the meat products and the others Turkish ravioli soy amounts were approximately 2%. On the other hand three samples (gluten-free cake, thyme and sage tea) were negative for the gluten. The gluten levels ranged 20.75-115.6 mg/kg for spices and 32.447-158.3 for starch samples. Ensuring a correct labelling of products, so prevent serious health consequences is an important part of quality assurance in food industry.

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NOVEL THERAPEUTIC UTILIZATION OF NON-EXPLOITED PLANTS/CROPS OF THE CENTRAL INDIA REGION AND THEIR DERIVATIVES IN HERBAL ANTIDIBETIC TEA FORMULATION

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Natural products compounds discovered from medicinal plants (and their analogues there of) have provided numerous clinically useful drugs or disease curing agents, such as having hypoglycemic effect (antic-diabetic properties) of the Central India Region and still remain as an essential component in the search for new medicines. Seed Powders of the Jamun (Syzygium Cumini) , Fenugreek (Trigonella foenum-graecum), Amla (Phyllanthus Embllica), Senna (Cassia Sophera), the Leaves of the Mango (Mangifera Indica), Bael Tree (Aegle Marmelos), Bitter Gourd (Momordica charantia) of non-exploited Plants or crops belongs to the botanical families of Central India region were subjected to physico-chemical and pharmaceutical properties to identify their uses for the commercial exploitation such as in antidibetic tea. As except to the Mango has excellent antidibetic properties properties such as exceptional hypoglycemic effects, mouth feel, post consumption feel among the patients suffering from Diabetes etc. At present very little work has been carried out on commercial utilization & exploitation of these non exploited plant or crops as a Herbal Antidibetic Tea. The work will be a step towards it, thus generating additional revenue for the poor farmers of this region to improve their standard of living.

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TOMATO POMACE - SOURCE OF ANTIOXIDANT POLYPHENOLS

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Tomato, rich in antioxidants such as polypenols, lycopene and vitamin C, is an important vegetable in the daily diet. Consumption of tomato products has been associated with decreased risk of various forms of cancers, as well as heart diseases. In view of the fact that most of the phenolic compounds remain in the waste product generated primarily during juice processing, the tomato pomace is a potential source of these phytochemicals. The aim of this research was to investigate the antioxidant activity of tomato pomace ethanolic extract. The contents of phenolic compounds (16.52 mg/g) and flavonoids (11.73 mg/g) in ethanolic and lycopene (3.43mg/g) and β-carotene (2.48 mg/g) in hexane extracts were determined spectrophotometrically. The antioxidant activity of tomato pomace ethanolic extract was investigated by measuring reducing power and DPPH scavenging activity by spectrophotometric method and hydroxyl radical scavenging activity by ESR spectroscopy. The reducing power of tomato pomace ethanolic extract increased with applied concentrations. The ability of scavenging DPPH and hydroxyl radical, expressed as IC_{50} values, was 0.27 mg/ml and 0.66 mg/ml, respectively. The obtained results show that the tomato pomace should be regarded as a valuable product and has potential as a value-added ingredient for functional foods.

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EFFECTIVE FACTORS ON ACRYLAMIDE FORMATION IN TYPES OF POTATO PRODUCTS

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In April 2002, the National Food Administration of Swedish (NFA) and Stockholm University's researchers announced that acrylamide is a toxic chemical compound and potentially carcinogenic for humans which is found in foods cooked or prepared in high temperatures.In this study, we assessed the effective factors on acrylamide formation in foods which are temperature and time of heating, PH changes, adding protein, adding carbohydrates, antioxidant effects, free radicals, ascorbic acid. The potato chips / pellet Samples were prepared with the different amounts of mentioned factors in order to determine the amount of acrylamide in fried product. The determination of mentioned factors in raw and fried potato chips were done by HPLC and GC/FID, respectively. There was a significant difference in the samples which had reducing sugar and asparagines. We found that the most effective factors on acrylamide formation are of reducing sugars (glucose and fructose) and amino acid asparagine . Also by control the mentioned factors above, we could decrease the amount of acrylamide to 80 %. According to this finding, it is recommended to apply specific techniques or factors to reduce the amount of acrylamide in potato chips/pellet and other products. Also there has been an assessment in industrial scale.

Keywords: acrylamide, time and temperature, PH, amino acid, antioxidant

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EFFECTS OF COOKING METHODS ON THE PROXIMATE COMPOSITION OF BLACK SEA ANCHOVY (ENGRAULIS ENCRASICOLUS LINNAEUS. 1758)

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The effects of different cooking methods (grilling, steaming, frying, microwave cooking) on proximate composition of anchovy (Engraulis encrasicolus Linnaeus. 1758) were determined. Mean moisture, protein, ash and fat contents of raw fish were %62.85±0.03, %22.71± 0.04, %1.48±0.005, %10.64±0.04, respectively. On comparing the raw and cooked fish, the results indicated that cooking methods had considerable affect on the proximate composition. The most water loss was in fried anchovy (%49.55±0.11). Mean protein and fat values of anchovies according to cooking methods were %25.55±0.18, %17.51±0.26; %22.58±0.18, %20.54±0.19; %24.44±0.22, %23.30±0.12; %22.63±0.14, %22.34±0.24, respectively. The highest protein and the lowest fat content was found in grilled fish; therefore, grilling can be recommended as the best cooking method for healthy diet.

Keywords: Anchovy, cooking methods, proximate composition.

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ANTICANCER, CHEMOPREVENTIVE, ANTIOXIDANT AND ENDOCRINE MODULATION EFFECT OF EUCHEUMA COTTONII A RED SEAWEED

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Breast cancer is the second most common type of cancer after lung cancer. Chemoprevention aims to interrupt or reverse the processes of carcinogenesis and reverse precancerosis. This study shows the chemopreventive effect of Eucheuma cottonii on breast cancers induced by LA7 a rat mammary tumor cell lines, and the underlying mechanisms. LA7 was injected into the breast of SD female rats to develop breast cancer. Thirty two rats were divided into four groups: (1) control group, (2) tamoxifen group, (3) whole seaweed group and (4) seaweed extract group. The incidence rate, latent period, number and volume of breast cancer were monitored. The mechanisms of action were investigated by conducting in-vitro and in-vivo study. The ethanolic extracts of Eucheuma cottonii showed cytotoxic activity against five human cancer cell lines and the most sensitive cell line was MCF7 cell line (breast cancer cell line). Treatment of MCF7 with various concentration of Eucheuma cottonii extract resulted in growth inhibition and induction of apoptosis in a time and dose dependent manner. Eucheuma cottonii extract also showed endocrine modulating effects in female Sprague-Dawley rats. Seaweed administration lengthened the rat estrous cycle from 4.2±0.2 to 5.8±0.4 at 150 mg/kg body wt. and to 5.6±1.8 at 300 mg/kg body wt, with interesting effects on the serum estradiol, progesterone, serum MDA concentration, the activity of antioxidant enzymes, catalase and Glutathione peroxidase.

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POLYPHENOLS AND THE IMMUNE RESPONSE

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A variety of in vitro studies have shown that polyphenols such as flavonoids are dietary antioxidants, immunomodulators and exhibit antigenotoxic effects. They can affect various aspects of both the innate and adaptive immune system, by shifting the pro-oxidant/antioxidant balance towards antioxidant. Studies have shown that some fruits and vegetables like berries, cherries, and carrots have high polyphenol content. Consumption of these products has shown to improve human antioxidant enzyme activity. As a result they can protect DNA, lipids and proteins from oxidative damage caused by reactive oxygen species, like hydroxides, peroxides and superoxide anion radicals. Furthermore, epidemiological studies have established the positive, health effects on humans of high intakes of polyphenols, by either, slowing down or preventing the development of chronic diseases such as cardiovascular diseases and some types of cancers. Moreover, in vivo and in vitro studies have provided evidence that pure polyphenolic compounds and natural polyphenolic plant extracts can modulate intestinal inflammation. In this review, we will provide an overview of laboratory and clinical studies, reflecting the effects of polyphenolic compounds on the immune system as well as on health status.

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UTILIZATION OF DIETARY FIBER TO REDUCE RESIDUAL NITRITE LEVEL IN MEAT PRODUCTS

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Nitrate/nitrite is widely used as a curing agent in meat products due to their functions, such as development of color and flavor, inhibition of pathogenic microorganism, and prevention of oxidative rancidity. Moreover, residual nitrite level in cured meat products has attracted reseachers' attention in recent years. Residual nitrite has toxic effect and triggers formation of nitrosamines which are citotoxic compounds. Six technological methods exist for reducing the nitrite level present in the meat products and the usage of citric co-products is one of them. Dietary fiber from citrus fruits has a higher soluble dietary fiber when compared to alternative sources of fiber like cereals and is effective on human health due to the presence of bioactive compounds such as flavonoids, polyphenols and vitamin C. However, researches showed that, these compounds decrease residual nitrite level. Lemon albedo, orange dietary fiber and their washing water used in the process can be used. In recent researches, lemon albedo was found more effective than cooked to reduce nitrite level. The influence of orange fiber could be increased incorporation of spice essential oils. The aim of this review is to examine the utilization of citrus co-products as a component to reduce residual nitrite level in the meat products.

Keywords: Residual nitrite level, dietary fiber, citrus co-products, cured meat products

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ANTIOXIDANT AND ANTIPROLIFERATIVE ACTIVITIES OF BEET ROOT BY-PRODUCTS

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Beet root is well-known and widespread vegetable, which contains a significant amount of polyphenolic compounds, carotenoids, betalains, etc. The beet root pomace, waste product generated primarily during juice processing is also promising source of bioactive antioxidants which could be used as additives for functional foods. The beet root pomace was extracted with 50% ethanol containing 0.5% acetic acid. Based on the fact that ethanol extract is accessible source of phenolic acids and flavonoids, the ESR determination of scavenging activity on $^{\bullet}OH$ and $O_2^{\bullet-}$ was applied on that extract. It was observed that the investigated ethanol extract of beet root pomace was less effective on superoxide anion scavenging than in $^{\bullet}OH$ radical assay. The IC_{50} values were 0.053 mg/ml for hydroxyl radical and 0.093 mg/ml for superoxide anion radical. These results indicated that ethanol extract of beet root pomace has strong antioxidant activities. The in vitro antiproliferative activity of extracts was detected on two human tumor cell lines - HeLa (cervix epitheloid carcinoma) and MCF-7 (breast adenocarcinoma). Beet root pomace extract influenced cell growth depending on cell line and extract dose. IC_{50} values were 0.647 mg/ml and 0.460 mg/ml for HeLa and MCF-7 cells, respectively.

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COMPARISON OF DIETARY EXPOSURE OF ACRYLAMIDE IN HIGH SCHOOL STUDENT GROUP OF CZECH AND SLOVAK REPUBLICS

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The acrylamide is classified by IARC as a probably human carcinogenic agent. The acrylamide arises from reducing saccharides and asparagine in thermally processed foods at temperature higher then 120 °C. Due to a wide occurrence of acrylamide in many staple cereal and potato based foods the exposure to acrylamide cannot be omitted. This study is focused on the evaluation of the preliminary survey on the acrylamide exposure from foods with a supposed higher acrylamide level in the group of high school students in the Czech and Slovak Republics and a comparison of acrylamide exposure in these two countries. A frequency and a distribution of consumption of food during a day were ascertained by standardized interview using a questionnaire. The data were evaluated depending on gender and time of day consumption. Exposure of acrylamide was compared in the Czech and Slovak Republics.

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NUTRITIONAL ASPECTS AND SAFETY OF ORGANIC FOODS

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Food security, nutritional quality and safety vary widely around the world. Up to now, industrialized production methods have clearly shown severe limitations such as a worldwide contamination of the food chain and water by persistent pesticide residues and reduced nutrient and flavor component through low – cost intensive food production and processing. In reality, the nutritional and toxicological value of food produced under methods of ecological agriculture has long been a matter of interest and debate. In all dates; organic agriculture is first defined as by the European Union Regulation (CE / 2092 / 91 and CE / 1804 / 99) and secondly by the French regulation for animal production. As summarize; the main characteristics of the organic agriculture production systems are the promotion of sustainable cropping methods, use of non-chemical fertilizers and pest / disease / weed control means, production of high quality foodstuffs and no use of genetically modified crops. In this review, the nutritional value of organic food will be described comparatively with that of conventional food and the sanitary properties of organic foodstuffs will be reported.

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EFFECTS OF APPLE VINEGARS ON LIPID PROFILE IN HYPERCHOLESTEROLEMIC RATS

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The existence of phenolic compounds in fruits, wines and vinegars has positive health effects against cardiovascular diseases and cancer due to their significant antioxidant activity. The aim of this study was to determine the effects of apple vinegar consumption on blood lipid levels in hypercholesterolemic rats. Fifty-four male Wistar albino rats (150-200g) were divided into six groups. All Rats were fed with standart rat chow and water ad libitum. 1 ml of 2.5% cholesterol was given with oral gavage to all groups of rats other than control group (group-1). Rats were given only cholesterol beside the rat chow and water without any vinegar treatment in cholesterol group (group-2). 1 ml gavage of various apple vinegars such as macerated traditional apple vinegar, traditional apple vinegar, macerated industrial apple vinegar and industrial apple vinegar were given to rats other than groups 1 and 2 (groups 3, 4, 5, and 6 respectively). Serum lipids were assayed using spectrophotometric method with Olympus AU 2700 auto analyser with its concordant commercial kits in all groups. Mann Whitney-U test was used in the statistical analysis. Serum triglyceride levels were decreased in all apple vinegar groups but the only significant decrease was observed in traditional apple vinegar group (4) ($p<0,05$). A significant increase in total, HDL, and LDL cholesterol levels were observed in all apple vinegar groups (groups 3, 4, 5, and 6), compared with the control group. The mean HDL-cholesterol level was highest in the macerated traditional apple vinegar group (3), and the mean Total and LDL-cholesterol levels were highest in the industrial apple vinegar group (6). Although the decrease of serum triglyceride levels in apple vinegar groups is benefical to cardiac health, the increase in cholesterol levels observed in these groups are controversial. Interestingly, the peak level of HDL-cholesterol seen in macerated traditional apple vinegar group is worth to pay attention, when one considers its protective role in ischemic hearth disease. However, further studies are needed to clarify the exact mechanism of apple vinegars on lipid metabolism.

Keywords: Apple vinegar, cholesterol, hypercholesterolaemic rats, triglyceride, HDL-cholesterol

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BLUEBERRY AS A FUNCTIONAL INGREDIENT IN GLUTEN-FREE CAKE PRODUCTION

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Besides nutritious values of foods, their protection against diseases has been also taken into consideration in the recent years. The tendency towards natural anti-oxidant has increased. Blueberry, naturally grown in different parts of the country, contains functional components abundantly. In this study, blueberries were used at different rates (0, 5, 15, 25%, fwb) in chestnut flour-based gluten-free cake formula. Blueberry cakes were compared with the control cake in the term of antioxidant capacity and total phenolic content. Antioxidant activity of the cake produced and blueberry were determined by DPPH radical scavenging capacity assay. Total phenolic content (TPC) were determined by using Folin-Ciocalteu method. DPPH value of bluebeery extract was 92%., the DPPH values of experimental cakes including (0, 5, 15, 25% fruit) were 68, 77, 80 and 86%, respectively. TPC for blueberry extract was 5.71 μ GAE/g. For prepared cakes with blueberry at the level of 0, 5, 15, 25%, the values were 0.85, 2.26, 2.43 and 2.45, respectively. The use of blueberries in gluten-free cake production significantly increased the content of phenolic compounds and antioxidant activity of the cake.

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FORMULA OPTIMIZATION OF GLUTEN-FREE CAKE WITH CORN FLOUR AND POTATO STARCH

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The range of gluten-free products must be expanded to meet a balanced way of the daily needs of celiac patients. In this study, possibility of corn flour as a source of protein in gluten-free cake production was investigated. Because of corn's own distinct flavors, the acceptability of corn- based bakery products have adversely and significantly affected. Thus, potato starch was added in formula to suppress the negative flavor and to take advantage of functionality. Response Surface Methodology (RSM) was used to optimize the rate of water adsorption, gum mixture and potato starch in the corn flour formula. The basic components (shortening, sugar, baking powder, non-fat milk powder, egg white powder) were kept constant in the study. Gluten-free corn flour cake and control wheat flour cake were compared in terms of physical, sensorial and textural attributes. Acceptable cake attributes compared to the control cake were obtained with 0.15% xanthan gum, 0.15s% guar gum (fwb), corn flour- potato starch mixture at the ratio of 1:1..

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TYPE 2 DIABETES, CARDIOVASCULAR DISEASES AND DAIRY PRODUCTS

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Diabetes mellitus is one of the most common endocrine disorders affecting almost 6% of the world's population. The number of people with diabetes will reach an estimated 300 million worldwide by 2025. More than 97% of these patients will have type 2 diabetes. Because management of diabetes and its complications, such as cardiovascular disease, amputation, blindness, and renal failure, imposes enormous medical and economic burdens, primary prevention has become a public health imperative. Recent studies have shown that diet and lifestyle modifications are important means of preventing type 2 diabetes. Dairy consumption is a dietary factor that might affect type 2 diabetes. Several studies have suggested that dairy products may have favorable effects on body weight, the major determinant of type 2 diabetes. In addition, a few studies, but not all, have suggested that dairy or calcium consumption was associated with lower risks for hypertension, coagulopathy, coronary artery disease, and stroke. To date, no published studies have examined the relation between dairy consumption and type 2 diabetes. A proper choice of foods to prevent or delay many of health consequences related to these disorders is therefore of relevance for a large segment of the population. The aim of this review is now to summarise recent findings from human studies on the effects of dairy products on risk factors of the type 2 diabetes.

Keywords: Type 2 diabetes, dairy products, cardiovascular diseases

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OBESITY IN A DOWN SYNDROME POPULATION: NEED FOR NUTRITIONAL INTERVENTION

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To evaluate the nutritional status in adults with Down syndrome (DS) by referring to their dietary intake, biochemical and anthropometric parameters were taken. Materials and Methods: The 38 persons with DS, 23 men and 15 women who formed the sample population came from two occupational centers for the intellectually impaired in the province of Murcia (Spain). Body composition was analyzed from anthropometric parameters, and physical activity as well as energy and nutrient intake by means of validated questionnaires. These last parameters were estimated from a record of all foods and beverages consumed during the previous 7 days, as recorded by the tutors of the participants. The following biochemical parameters were estimated: blood lipids profile, uric acid, proteins (albumen, ferritin, transferrin), minerals and vitamin. Results: Of the 38 participants, 36.8% were overweight (BMI: 25-29.9kg/m2) and 36.8% were obese (BMI≥30kg/m2). The BMI differed between men and women ($p<0.001$) (27.9±4.6 and 29.1±4.3 kg/m2, respectively). The average values of the biochemical parameters both in men and women were within ranges considered normal. The average energy intake was 1909±337 and 2260±284 kcal/day for women and men, respectively. Physical activity of the group was low, being the average applied physical activity factor being 1.3 both in men and women. Conclusion: The results show that a high percentage of the group studied can be, classified as overweight or obese. Nutritional intervention should be undertaken with this group to improve their nutritional status and quality of life.

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THE EFFECTS OF OMEGA-3 FATTY ACIDS ON HEALTH

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Omega-3 fatty acids have been shown to significantly reduce the risk for sudden death caused by cardiac arrhythmias and all-cause mortality in patients with known coronary heart disease. Fish and fish oils contain the 20-carbon eicosapentaenoic acid (EPA) and the 22-carbon docosahexaenoic acid (DHA), whereas canola, walnut, soybean, and flaxseed oils contain the 18-carbon α-linolenic acid (ALA). In addition to being antiarrhythmic, the omega-3 fatty acids are antithrombotic and anti-inflammatory. Omega-3 fatty acids also are used to treat hyperlipidemia, hypertension, and rheumatoid arthritis. There are no significant drug interactions with omega-3 fatty acids. The American Heart Association recommends consumption of two servings of fish per week for persons with no history of coronary heart disease and at least one serving of fish daily for those with known coronary heart disease. Approximately 1 g per day of eicosapentaenoic acid plus docosahexaenoic acid is recommended for cardioprotection. Higher dosages of omega-3 fatty acids are required to reduce elevated triglyceride levels (2 to 4 g per day) and to reduce morning stiffness and the number of tender joints in patients with rheumatoid arthritis (at least 3 g per day). Modest decreases in blood pressure occur with significantly higher dosages of omega-3 fatty acids.

Keywords: Omega-3, fatty acids, health

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STUDY ON ENRICHMENT OF SPONGE CAKE OF SOYA FLOUR

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In this research some physicochemical properties (moisture , pH , water activity and specific volume) as well as descriptive specifications or features (texture , taste , color and smell) of butter cake , derived form exchanging different amount of soy flour for wheat flour as well as using water and guar gum in its formulation was evaluated. In this respect the approved cake was finally analyzed upon nutrition criteria for evaluating the rate of fortification (enrichment) resulted from added soy flour. The soy flour added amounting 5 , 10 up to 15 % of the total weight of the flour , guar gum as zero (0) or and 1.4 gr and the water as 110 gr and 120 gr , all of them as the variables of the first test (the first 3%) and of the amounting 20 , 25 and 30% of the flour total weight , the guar gum as zero (0) or and 1.4 gr and the water as 120 gr and 130 gr , all of them as the variables of the second test (the second 3%) have been considered , the derived results were analyzed in the form or array of three factors factorial scheme within a full completely randomized design. The descriptive features (texture, taste, color and smell) of the treatments were also evaluated by four skillful panelists upon 5 point hedonic test. Considering the fact the soy flour 25% adding along with the gum causes the quality fixing of the product so the treatment approved as the optimum treatment. Therefore, according to nutrition analyzes the amounting of protein 1.4, calcium (ca) 106, Fe 2.3 and vitamin E 2. 58 were equal to the cake specimen.

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GENOTYPE -BASED NUTRITION: DIETARY INTERVENTION FOR THE PREVENTION OF DIET-RELATED DISEASES AND IMPROVEMENT OF LIFE QUALITY

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Nowadays, nutrition researches focusing on keeping and improving human health attempt to slowdown and even prevent the emergence of chronic diseases such as cardiovascular diseases, diabetes, obesity and some types of cancer. Besides environmental factors, genetic factors also affect the human health. This fact has brought out two recent branches; nutrigenomics and nutrigenetics. While nutrigenomics studies the interaction of nutrients with genome and gene expression, nutrigenetics examines the effects of genetic differences on diet-disease interaction. The completion of Human Genome Project has created opportunities for increasing our knowledge about genetic differences between people and for application of nutrigenetics into daily life by leading to the emergence of personalized nutrition. Personalized nutrition aims to provide optimal health according to genotype-based dietary interventions to prevent diet-related diseases and improve the life quality. The reasons of genetic differences leading to emergence of personalized nutrition are considered as genetic polymorphisms, epigenetic and epistatic interactions. Current techniques used in nutritional genomics; proteomic, metabolic and transcriptomic help to reveal genetic differences. In this review, we provide an overview of personalized nutrition from our point of view by describing the causes leading to this concept and the current techniques used in this field.

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EFFECT OF CUMINUM CYMINUM L. ESSENTIAL OIL AND A PROBIOTIC (LACTOBACILLUS ACIDOPHILUS) ON STAPHYLOCOCCUS AUREUS DURING MANUFACTURE, RIPENING AND STORAGE OF WHITE BRINED CHEESE

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The efficacy of Cuminum cyminum L. essential oil (EO) and a probiotic (Lactobacillus acidophilus) on Staphylococcus aureus in white brined cheese was investigated. This design included three levels of EO (0, 7.5, 15, and 30 μL 100 mL^{-1} milk) and Lactobacillus acidophilus (0 and 0.5%) to assess their effects on S. aureus count during manufacture, ripening and storage of Iranian white brined cheese for up to 75 days. The significant ($p < 0.05$) main and interactive inhibitory effects of EO (even at its lowest concentration) and the probiotic on this organism were conclusively demonstrated. Considering the organoleptic effect of the EO used in this study, the best inhibitory effect was obtained at combination of EO = 15 μL 100 mL^{-1} and probiotic = 0.5%. The significant ($P < 0.05$) synergistic inhibitory effect of the EO and probiotic on S. aureus shown in this study, can improve the scope of EO function in the food industry.

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CURD SCALDED TURKISH CHEESE TECHNOLOGY

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Cheese is a dairy product which has maximum variety. Today, very few types of cheese can be produced by continuous system. Production is largely based on labor. As a rule, how much otomation in the production of cheese is made, so much hygienic and standard products can be obtained, because the majority of transactions are performed in hygienic conditions. Cheese produced by scolded curd constitutes an important group of cheese consumed in Turkey. Kaşar, Dil, Örgü, Çerkez, Antep and Çeçil cheese types are major curd scalded cheese varieties produced and consumed in Turkey. From these cheese types, kaşar cheese is known and consumed around the country while others are generated and consumed locally. Recently, due to the rapidly increasing number of market chains, most of these types of cheese have been taken to all parts of the country and have begun to be recognised and consumed around the country. In this study, the industrial production methods of Turkish cheese produced by scalding curd in the factory section according to today's technology will be explained. In production line common and different applications will be displayed. What stage of production is still based on labor, in order to adapt to machine production, what changes are made according to traditional methods also will be announced.

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TECHNOLOGICAL CHARACTERIZATION OF LACTIC ACID BACTERIA ISOLATED FROM ALGERIAN'S GOAT'S MILK

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A total of 153 wild lactic acid bacteria were isolated from goat's milk collected from different areas in Western Algeria. The strains were identified using phenotypical, biochemical and physiological properties. API system and SDS-PAGE technique was also used in identification of the strains. Six genera were found Enterococcus (41.83%), Lactobacillus (29.40%), Lactococcus (19.60%), Leuconostoc (4.57%), Streptococcus thermophilus (3.26%) and Pediococcus (1.30%). The most abundant species were Enterococcus faecium (24 isolates), Enterococcus durans (22 isolates), Lactococcus lactis subsp. lactis (25 isolates), Lactobacillus rhamnosus (09 isolates) and Lactobacillus delbrueckii subsp. bulgaricus (07 isolates). The strains were screened for production and technological properties such as acid production, aminopeptidase activity, autolytic properties, antimicrobial activity and exopolysaccharide production. In general most tested isolates showed a good biomass separation when collected by centrifugation; as for the production of the lactic acid, results revealed that our strains are weakly acidifying; nevertheless, lactococci showed a best acidifying activity compared to lactobacilli. Aminopeptidase activity was also weak in most strains; but, it was generally higher for lactobacilli compared to lactococci, where we recorded 30 units for Lactobacillus delbrueckii subsp. bulgaricus M14. Autolytic activity was generally higher for most strains, more particularly lactobacilli where we recorded values of 71.13% and 70% of autolysis rate respectively in Lactobacillus rhamnosus strains 9S10 and 9S7. Antimicrobial activity was detected in 50% of the isolates, particularly in lactobacilli where 80% of strains tested were able to inhibit the growth of other strains. Two strains could produce exopolysaccharides, E. faecium 8M6 and E. durans 7S8. Some strains were able to maintain two or three technological characteristics together.

Keywords: Autolytic activity, aminopeptidase, SDS-PAGE, Goat's milk.

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EXOPOLYSACCHARIDES IN MILK AND DAIRY PRODUCTS AS A FUNCTIONAL COMPONENT

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Polysaccharides produced out of cell wall by some lactic acid bacteria strains are called exopolysaccharides. The synthesized exopolysaccharide amount and the characters are influenced by environmental conditions such as incubation time, pH and temperature. Exopolysaccharides may be used primarily in many areas of food industry due to functional properties. Exopolisaccharides improves appearance, flavor, viscosity and the organoleptic properties of fermented milk products such as cheese and yogurt. It was also reported that exopolysaccharides can be used as functional starter cultures in yogurt. Structural defects occurred in reduced-fat dairy products may be reduced by using exopolysaccharide. Moreover, prebiotics activity has been reported with some exopolysaccharides. At the same time, it is also reported that EPS show antitumor, antiulcer, anti-viral and cholesterol-lowering activity contributing positively to human health. Besides all these features, the lack of any restrictions on exopolysaccharide consumption and absence of any allergic reactions increase the possibilities of feeding sensitive individuals. In this study, the possibilities of exopolysaccharides use as a functional component in milk and dairy products will be discussed in the light of current studies.

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PROPERTIES OF ACIDOPHILUS MILK PRODUCED WITH DIFFERENT FLAVOURS

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The objective of this study was to determine the effect of storage on chemical, microbiological and sensory characteristics of acidophilus milks produced with different flavours. Acidophilus milks were produced by the addition of L. acidophilus (LA5), three different flavouring preparations and sugar. The fruit flavours of strawberry, lemon and cherry were used separately in acidophilus milks. Products were incubated at 37 °C for 15h and stored at 4°C. Finally four different acidophilus milks were produced including control. The chemical, microbiological and sensory properties of acidophilus milk samples were detected during the 1st, 7th, 14 th, 21th and 28th days of storage. The significance of storage period and difference between samples was determined statistically. The viable counts of L. acidophilus were changed between 7.94 - 8.41 log cfu/ml during storage. The acidity of samples were decreased continuously till 21st day but was not changed after this period. According to sensory evaluation the most liked sample was strawberry-flavoured acidophilus milk at all storage period. In terms of L. acidophilus counts, all samples were acceptable as probiotic products. The sensory characteristics of all sample were protected during the shelf life. We believe that acidophilus milk will be a preferable product in Turkey by consumers.

Keywords: L. acidophilus, Acidophilus Milk, Probiotics

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EFFECT OF PROBIOTICS ON THE ALLERGIC DISEASES

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The immune system is generally divided into the innate and the adopted immune systems, both protecting the body from pathogens. Recently, allergies, a disease associated with an imbalanced immune system, have increased rapidly in developed countries. Prevailing symptoms of allergic diseases are eczema, allergic rhinitis, asthma, inflammatory bowel disease, and food allergy. Growing concern over the adverse immunologic effects of progressively more hygienic environments has led to enormous interest in the role of probiotics in the prevention and treatment of allergic disease. Probiotics are the live microbial feed supplements that beneficially affect the host animal by improving its intestinal microbial balance. Probiotics have been demonstrated to have anti-inflammatory properties. Their anti-inflammatory properties associated with changes in cytokine expression that could potentially facilitate T1-helper cell immune response, which could inhibit the development of allergic T2-helper cell response and allergic (IgE) antibody production. Although there are studies suggesting favorable effects of probiotics on allergic disease, the immunoregulatory impact of probiotic bacteria is controversial because it depends on probiotic strains, a dose and a type of diseases. Therefore, it is generally accepted that larger, controlled studies should be performed with well defined probiotic bacteria strains.

Keywords: Probiotics, Allergic disease, Immun development

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USE OF ULTRASONICS FOR THE QUALITY ASSESSMENT OF YOGHURT

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The main objective of this study is to evaluate yoghurt quality during fermentation. Conventionally, the pH meter is used to determine the fermentation progress of yoghurt by measuring its acidity. However, this method is inconvenient and time-consuming. In this study, monitoring of milk fermentation in yoghurt production by ultrasonic pulse-echo technique is attempted. The pH change during yoghurt fermentation is evaluated and compared with ultrasonic measurements. Two independent ultrasonic parameters, amplitude and time of flight were measured according to temperature and fermentation starter, as a function of time. Variations in the ultrasonic measurements illustrate more clearly the evolution signature of the yoghurt. The study demonstrated that using ultrasonic properties, we obtain reliable results to monitor and control yoghurt quality. Consequently, analysis like pH or acidity measurements could be substituted by this ultrasonic technique.

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MOLECULAIR IDENTIFICATION AND CHARACTERIZATION OF ENTEOCOCCUS FAECIUM STRAINS ISOLATED FROM EGYPTIAN CHEESES

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Enterococci have important implications as non-starter microflora. They occur as non-starter microflora in a variety of cheeses, especially artisan cheeses produced in Middle East. The aim of this study was identified and characterized Enterococcus faecium strains isolated from 17 Domiatti and Ras cheese samples. Thirty-five strains of Enterococcus were identified by genotyping PCR-method as Enterococcus faecium which was showing at least 80% homology. In the present study we investigated the incidence of two virulence factors (haemolysis and antibiotic susceptibility). The haemolysis that was assayed on plates containing human blood agar was not found in any of the studied enterococcal strains. The sensitivity to 20 different kinds of antibiotics was determined by the disc diffusion method. As an interesting result, one strain was sensitive to 18 antibiotics and 21 strains were susceptible to 16 antibiotics. The biochemical technological properties such as proteolytic, autolytic and acidification activities were studied. Ten strains of Enterococcus faecium displayed simultaneously high proteolytic, autolytic and acidification activities. These strains showed potentially interested properties in dairy products industries.

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THE FATE OF AFLATOXIN M_1 IN MILK USED IN THE PRODUCTION OF LIBYAN YOGHURT UNDER SIMULATED CONDITIONS

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This study was carried out to determine if there was a relationship between the reduction of Aflatoxin M_1 (AFM_1) and the method used for production of yoghurt at dairy factories in the north west of Libya. Three milk samples were separately spiked with AFM_1 to obtain AFM_1 concentration of 0.85, 2.78 and 4.59ng AFM_1/ml in the milk samples. Natural yoghurt containing viable bacteria (Lactobacillus acidophilus and Streptococcus thermophiles) was added to each spiked milk sample as starter culture. During the yoghurt production process growth of viable bacteria was observed. The levels of AFM_1 in yoghurt samples were quantified using HPLC after the extracts had been purified using an immunoaffinity column procedure. During the production of yoghurt, the levels of AFM_1 decrease by 57.6, 47.9 and 51.2%. Bacteria used in the production of yoghurt did not affect AFM1 levels in milk, although bacteria cell count increased from 5.37 to 8.94 $\log_{10}$ cfu/ml accompanied by pH decrease from 6.3 to 4.6.

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DETERMINATION OF AROMA COMPOUNDS OF KEFIR PRODUCED BY SECONDARY FERMENTATION

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In this study, aroma compounds of kefir produced by secondary fermentation were investigated. For this purpose, cow's milk samples (containing 1. 5% fat levels) were fermented with kefir grains up to certain pH levels (5. 0-5. 5 pH), and then each of them was inoculated with various starter cultures. Thermophilic-, probiotic-, mesophilic-aromatic cultures, and yeasts were used as secondary starter cultures. Kefir samples were analyzed for acetaldehyde, aceton, butanon, ethanol and diacetyl on days 1, 5, 10, 16 and 23 during the storage. It was found that in all samples (kefir samples produced traditionally and by secondary fermentation) acetaldehyde and ethanol had increased during storage, but diacetyl had decreased. The content of butanon hadn't change too much, however, it had shown an upward trend with progress of storage. When a comparison was made between samples within a period of 23 days, the highest acetaldehyde and diacetyl contents were obtained in the sample added thermophilic culture and the traditional method (only with kefir grains) ($p<0, 05$). It was determined that the ethanol contents of the sample added yeasts were greater than the other samples contained thermophilic-, probiotic-, mesophilic-aromatic cultures ($p<0. 05$).

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EFFECTS OF PULSED ELECTRIC FIELDS ON BIOACTIVE COMPOUNDS IN FOODS

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Pulsed electric field (PEF) processing is a non-thermal method of food preservation that uses short bursts of electricity for microbial inactivation and causes minimal or no detrimental effect on food quality attributes. PEF processing involves treating foods placed between electrodes by high voltage pulses in the order of 20–80 kV. Application of PEF technology has been successfully demonstrated for the pasteurization of foods such as juices, milk, yogurt, soups, and liquid eggs. As an alternative to the conventional methods, PEF has been studied as a non-thermal food preservation method for food pasteurization process. The effects of pulsed electric field processing conditions on the stability of bioactive compounds in food systems; PEF treatments can also be used to induce changes in the protein structure and functionality. PEF treatments have been reported lower protein denaturation and loss of Vitamin C than heat treatment. PEF treatments induce little changes in the profile of fatty acids and their functionality. PEF treatments also have been reported to cause less change in water soluble and fat soluble vitamins content than conventional processing treatments. PEF treatment conditions have not been affected by the content of carotenoids, flavonoids, antioxidant activity and ACE inhibitory capacity.

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BIOLOGICAL AND HEALTH EFFECT OF k-CASEİN MACROPEPTIDE

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Biologically active peptide from milk, such as caseinomacropeptide (CMP), is of particular interest in food science and nutrition because they have been shown to play physiological roles for the manufacture of novel functional foods. CMP is derived from κ-casein by the action of rennet and has received much attention due to its unique composition and characteristics that offer health promoting effects with multiple possible applications. The κ-casein macropeptide has been reported to exhibit multiple biological activities, such as the ability to bind enterotoxins, hinder bacterial and viral adhesion, modulate immune system responses, promote bifidobacterial growth, suppress gastric secretions, and inhibit platelet aggregation. Bioactive peptides may act in the body as regulatory components with a hormone-like activity which may modulate specific physiological functions. Examples of casein-derived bioactive peptides include caseinophosphopeptides (CPPs) that may play a role in the transport and absorption of certain minerals ; glycomacropeptides (GMP) that bind toxins and casoxins that behave as opioid antagonists while casomorphins (αs_1-casein, f(90–95); Arg-Tyr-Leu-Gly-Tyr-Leu) may behave as opioid receptor agonists. In addition, multi-functional bioactive effects have been identified within specific casein sequences, for example, peptides from f(60–70) of β-casein show immunostimulatory, opioid and angiotensin-converting enzyme (ACE)-inhibitory activities.

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EFFECT OF SALTING TIME ON THE QUALITY OF WHITE PICKLED CHEESE

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In this research, some physical and chemical properties of White Pickled cheese ripened for 90 days after keeping in prebine solution at different times were investigated. For this purpose, cheese blocks were immersed in brine bath containing 14 % NaCl for 5 h, 10 h, and 15 h. The brine blocks in tinned cans filled with same brine were ripened at 7±1 °C and analyzed on days 1, 7, 15, 30, 60 and 90. Total solids, fat, and salt contents, nitrogenous compounds, pH, titratable acidity, tyrosine and penetrometer values were determined in cheese samples and brines in which the cheese samples were ripened. As the salting time increased, total solids and salt content of the cheese increased whereas fat and soluble nitrogen content and ripening index value remain unchanged. Generally, decreases in titratable acidity of the cheese samples kept in brine at 15 hours were observed during the ripening period. Depending on the ripening period and increasing salting time, low penetrometer values in cheeses were obtained. High salt content affected the sensory properties negatively so the cheese samples had low organoleptic scores. Total solids and salt contents of brine in which the cheese samples were ripened decreased whereas total nitrogen content and titratable acidity of brine increased.

Keywords: White pickled cheese, salting time, brine

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IMPROVEMENT OF A YOGHURT DRINK (DOOGH) STABILIZATION BY HYDROCOLLOIDS

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Doogh is a yoghurt drink produced in Iran and manufactured traditionally or industrially by adding water and salt into yoghurt. Serum separation in Doogh, a acidic dairy drink, is a main problem which happens due to low pH (≤4.00) and aggregation of caseins. Hence, in the present study the influence of some hydrocolloids on prevention of serum separation as well as sensory quality of product was investigated. Xanthan gum (XG), gelatine (GG) and Carboxymethyl Cellulose Gum (CMC) at different concentrations were added to traditionally manufactured Doogh and the samples were evaluated for sensory properties and serum separation during storage for 30 days at 4 °C. Mouthfeel and flavour of the samples were assessed by a highly trained panel. CMC produced significantly higher thickness than GG and XG. XG and GG did not prevent serum separation in Doogh at a level of 0.1 and 0.3%, resp. but were effective at an increased concentration. The yoghurt aroma of the samples containing CMC and GG was perceived as less intense compared with the control. Furtheremore, XG produced a slimy mouthfeel that was not suitable for Doogh.

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MICROBIAL QUALITY OF FETA CHEESE SUPPLEMENTED WITH FERMENTED WHEY PROTEIN CONCENTRATE

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A large quantity of whey in Iran is still discarded and only some amount of whey obtained from non UF Feta cheese making is converted to powder with a low quality. Fermented whey protein concentrate (FWPC) is a semi-concentrated whey protein with more than 3.5% protein and acidity about 70-90 ^{o}D i.e. 0.7-0.9 per cent lactic acid. The aim of this study was to investigate the microbial quality of Feta cheese supplemented with FWPC. Feta cheese samples were prepared and examined for microbiological quality during six months of ripening and storage period. Feta cheese samples were also tested for the important pathogens including Staphylococcus aureus, Enterococcus spp., Salmonella spp., Shigella spp., E. coli, Pseudomonas spp, Proteus spp., Klebsiella spp. and emerging pathogens e.g. Listeria spp. Results showed no incidence of pathogens in all the Feta cheese samples. Analysis of variance of data revealed that mold and yeast counts (log cfu/g) were significantly (P=0.000) affected by supplementation with FWPC, while coliform count was not affected (P= 0.060). However, the count of mold and yeast along with coliforms were significantly (P=0.000) affected by the storage period. The count of mold and yeast in supplemented samples during ripening were slightly higher than control. However, after ripening and during storage period these differences were significant. During early stage of ripening, the counts of coliform in all groups significantly declined and after two weeks of ripening it was not detectable. Presumptive coliform test with Mac Conkey's broth and Durham's tube for all the Feta cheeses after two weeks till the end of storage period was also negative. This can be explained by the development of inhibitory conditions, such as low pH, lack of oxygen, high concentration of salt, depletion of sugars and secondary metabolites production such as bacteriocin e.g. nisin and lactocin produced by lactic acid bacteria. In general, all supplemented Feta samples had acceptable microbiological quality.

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VIABILITY OF PROBIOTIC BACTERIA IN SOME PROBIOTIC YOGHURT BEVERAGES (DUGH) PRODUCED IN IRAN

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Recently probiotic foods are expected to develop out of the increasing demand for a health-oriented society. Sensory quality and survival of the most two probiotic organisms i.e. L. acidophilus and Bifidobacteria spp. in yoghurt beverage samples obtained from 4 different manufacturers during 3 months of storage at 4 °C were investigated. The average number of L. acidophilus was higher in all beverages and amount of this probiotic organism was also higher than Bifidobacteria spp. during storage period. Results showed that both the evaluated factors i.e. number of probiotic organisms and sensory attributes were decreased throughout the storage period. This work showed that all beverages had lower L. acidophilus and Bifidobacteria spp. counts at the time of manufacturing and throughout of storage period. Although all the products showed a constant decline in the numbers of viable L. acidophilus and Bifidobacteria during storage and the counts at the end of storage deadline were lower (inferior than 10^6 cfu/ ml) than the suggested viable counts of probiotic strains for consumption (more than 10^6 cfu/ml), by taking in to account, the lack of standard methods, lack of specific culture media for enumeration of probiotic bacteria and vast strains of probiotics, this issue still demands more research to judge with certainty about these type of products.

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INCLUSION OF ENTEROCOCCUS FAECALIS AND ENTEROCOCCUS FAECIUM TO UF WHITE CHEESE

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Lighvan cheese is basically made from sheep milk in the area of Sahand mountainside which is located in the North West of Iran. The main objective of this study was to investigate the effect of enterococci isolated from traditional Lighvan cheese on the quality of Iranian UF white during ripening. The experimental design was split plot based on randomized complete blocks, main plots were four types of starters and subplots were different ripening durations. Addition of Enterococcus spp. did not significantly ($P<0.01$) affect the pH and gross composition of cheeses. In the cheeses produced with Ent. faecalis and Ent. faecium strains, lipolysis rates were higher and flavor was improved. Moreover, proteolysis assay by measuring percentage of soluble nitrogen at pH 4.6 and urea polyacrylamide gel electrophoresis indicated the increase in proteolysis rate in the cheese containing Ent. faecalis and Ent. faecium strains compared to the control cheeses. Furthermore, the highest percentage of non- protein nitrogen was observed in the cheese containing Ent. faecium. In conclusion, the results showed the positive effect of the Ent. faecalis and Ent. faecium.

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IRANIAN UF WHITE CHEESE SOFTENING DURING RIPENING

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The relationships between Proteolysis and soluble calcium levels with hardness of cheese texture were investigated in Iranian UF white cheese during 90 d ripening. Cheeses were sampled in interior and exterior. Results showed that levels of proteolysis, soluble calcium and hardness of cheese texture changed significantly ($p < 0.05$) over ripening. Levels of proteolysis and hardness were significantly ($p < 0.05$) different in interior and exterior zones of cheeses. External zones of cheeses became softer and had higher levels of proteolysis compared to internal zones during ripening. These result showed that proteolysis can contribute to textural softening during ripening of Iranian UF white cheese.

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GRAININESS AND ROUGHNESS OF STIRRED YOGHURT AS INFLUENCED BY FAT CONTENT

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The aim of this work was to study how fat content of yoghurt milk can affect the graininess and roughness of stirred yoghurt. Yoghurt milk (15.0% total solids) with three levels of fat (0.1, 1.5 and 3.5%) was heated at 95°C for 5 min. After cooling to 42°C, thermophilic starter culture was used in the manufacture of stirred yoghurt and the yoghurt milk was incubated at 42°C until pH decreased to 4.60. Fermentation was stopped by rapidly cooling to 4°C in an ice-water bath. At the beginning of the cooling in an ice-water bath the yoghurt was manually stirred with a stainless-steel bored disk by up and down movements for almost 60 s. After setting the stirred product into 200 mL cups, the stirred yoghurt samples were stored at 4°C for 2 days. Graininess and roughness of the yoghurt samples were quantitatively determined by means of an image analysis and evaluated at day 2 of storage. Number of grains, perimeter of grains and visual roughness decreased, when fat content of yoghurt milk increased.

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INFLUENCE OF STARTER CULTURE AND INCUBATION TEMPERATURE ON THE PHYSICOCHEMICAL, MICROBIOLOGICAL AND SENSORY PROPERTIES OF SET YOGHURT

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The aim of this work was to study how the type of starter culture and the incubation temperature affect the physicochemical, microbiological and sensory characteristics of set yoghurt. Yoghurts were produced using three different starter cultures that had been incubated at 37, 42 or 45 °C and stored at 4 °C for 14 days. The firmness, syneresis, number of grains and visual roughness decreased as an exopolysaccharide-producing starter culture was used, as well as with decreasing incubation temperature. The concentration of the exopolysaccharide and the apparent viscosity increased with the application of an exopolysaccharide-producing starter culture and, likewise, with increasing incubation temperature. The viable counts of *Streptococcus thermophilus* decreased as the incubation temperature was increased. In contrast, the viable counts of *Lactobacillus delbrueckii* ssp. *bulgaricus* increased as the incubation temperature was increased. There was no effect detected on the viable counts of both bacteria as a result of the type of starter culture. Scores for the aroma, structure, and appearance had rated the highest in yoghurt samples produced by using an exopolysaccharide-producing starter culture and incubated at higher temperatures (42 or 45 °C).

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THE BIOCHEMICAL AND TEXTURAL PROPERTIES OF KASHAR CHEESE SOLD IN THE SUPERMARKETS IN IZMIR, TURKEY

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Kashar cheese is one of the most popular traditional Turkish cheeses, which has also been manufactured on an industrial scale. It is generally manufactured from either sheep or cow's milk, or a mixture of both as 45.000 tons per year in Turkey. The characteristics of Kashar cheese are similar to other semi-hard cheeses such as Caciocavallo, Provolone, Regusono and Kashkaval. In the study 11 brands of Kashar cheeses, from different cheese plants situated in the Aegean and Marmara regions, were obtained randomly from the supermarkets in Izmir. All of the samples were packaged in plastic pouch under vacuum. The biochemical and textural (hardness, adhesiveness, cohesiveness, gumminess and resilience) characteristics were examined in the samples. The contents of total solids, fat, protein, lactic acid and salt changed between 47.26-58.26 %, 14.75-41.25 %, 18.63-24.47 %, 1.08-2.16 % and 1.23-3.38 %, respectively, while the ripening index varied between 2.91-10.32 % in the samples. Textural properties of cheese samples differed among trade marks and the highest hardness, adhesiveness and protein contents were found in the same sample.

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APPLICATIONS OF HIGH-HYDROSTATIC PRESSURE ON MILK AND DAIRY PRODUCTS

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High hydrostatic pressure processing (HP) is emerging as a commercial alternative to widespread thermal processing of foods and being applied recently with hygienic or technological objectives, and many of these applications have focused on milk and milk products. An advantage of HP is that it may result in large decreases in viable number of microbial contaminants in the range 300–700 MPa, without negative effects on flavour or nutritional components due to the fact that only non-covalent bonds are affected by the pressure treatment. Also, high pressurized food product is treated uniformly compared to the conventional thermal processing. However, HP processing can cause reversible and irreversible changes in milk and the rheological properties of dairy products depending on the pressure used and the duration and temperature of treatment. HP fragments the casein micelle increasing the amount of serum casein and minerals, and causing also important denaturation of whey proteins. As result of modifications caused by HP, the coagulating properties of pressure treated milk and the rheological characteristics of milk-based gels are affected. In this review, application of high pressure processing in dairy industry and its effects on the properties of milk and milk products were discussed.

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THE EFFECT OF HIGH PRESSURE PROCESSING ON THE LACTIC ACID BACTERIA IN WHITE CHEESE

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In cheese technology, most of the research on the use of high pressure processing has been focused on inactivating microorganisms, especially pathogenic microorganisms. The lactic acid bacteria can be affected by HPP depending on their genus, species, growth phase, composition of cheese and processing pressure, time and temperature. White cheese samples after brining were subjected to HPP at 50, 100, 200 and 400 MPa for 5 and 15 min. at room temperature. The decrease in the counts of Lactococcus spp., Lactobacillus spp. and Streptococcus thermophilus of the cheeses were investigated because of their importance for cheese ripening. Total lactobacilli were enumerated on Rogosa SL agar incubated anaerobically for 2 days at 37 °C; Lactococcus spp. were enumerated on M17 agar at 30 ºC for 2 days. Streptococcus thermophilus was enumerated on M17-lactose agar containing 0. 15% lithium chloride incubated for 2 days at 42 °C. The initial levels of Lactococcus spp., Lactobacillus spp. and Streptococcus thermophilus were 8. 98±0. 12, 7. 81±0. 26 and 8. 11±0. 40 cfu/g, respectively. The pressures at 50, 100 and 200 MPa, regardless of processing time, did not affect the viable counts of microorganisms above mentioned. On the other hand, the HPP at 400 MPa for 5 min. resulted in a 5 to 7 log cfu/g reduction while the lactic acid bacteria counts of the cheeses pressurized at 400 MPa for 15 min. were under the detection limit.

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NATURAL STATES CHANGES OF COWS AND BUFFALOES MILK PROTEINS INDUCED BY MICROBIAL TRANSGLUTAMINASE

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The percent incorporation of some amino acids in milk protein as a result of cross-linking by Microbial Transglutaminase (MTGase) was investigated. Effect of MTGase on electrophoretic patterns, microstructure, micellar hydration and sedimentable solids of milk proteins as well as the viscosity of whole and skim Cows' and Buffaloes' milk was also studied. Incubation of milk with MTGase at 40°C for 1h prior to thermal inactivation (at 80°C/2min) resulted in a complete incorporation of Glutamine and Arginine in skim Cows' milk protein and Glysine and Valine in skim Buffaloes' milk protein. That treatment also induced reductions in levels of monomeric caseins (αs1-, β-, and κ-caseins), α-lactalbumin and β-lactoglobulin and an increase in the fractions of relatively low electrophoretic mobility. The effect of MTGase on the microstructure of treated samples was quite clear; the enzyme was capable of forming covalent linkages between protein molecules. The micellar hydration and viscosity of treated skim milk samples were markedly improved and were the highest between the samples makes it possible to produce different types of dairy products with low fat contents or a reduced content of non-fat solids.

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DETERMINATION OF RELATIONSHIP BETWEEN SOMATIC CELL COUNT AND CATALASE ENZYME ACTIVITY IN RAW MILK OF ANATOLIAN BUFFALOES

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The objective of this study was to determine the relationships between somatic cell count (SCC) and catalase (CAT) activity of milk samples of Anatolian buffaloes. The data were collected in two smallholder farms of Samsun province, Turkey. A total of 64 samples of bucket milk were analyzed for SCC and CAT during October to November 2008. SCC analyses were performed using direct microscopy, and CAT values were obtained from the observation of enzyme activity scores. The data were tested by one-way analysis of variance (ANOVA), and farms were compared by t-test. All statistical analyses were performed using SPSS 10.0 software. While, no significant differences in each parameter were determined by test days (TD), SCC values tended to elevate with higher CAT scores. In herd level, two farms had similar levels by SCC, but significantly differences were obtained in CAT values. Estimated high (r=0.806) correlation in the present work clearly indicated that CAT values can be used to determine quality of buffalo raw milk.

Keywords: Somatic cell count, catalase, enzyme activity, milk, milk quality, buffalo

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HEAT-INDUCED CHEMICAL AND PHYSICAL CHANGES ON THE CASEIN MICELLE STRUCTURE UNDER UHT CONDITIONS

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The aim was to obtain insights regarding thermal reactivity of the casein micelle which so far has been considered very heat-stable. Milk was fractionated in its main protein fractions by means of microfiltration / diafiltration with a combination of ultrafiltration so that pure, whey protein-free native casein could be made available. With pure casein solutions different structural and molecular changes in the casein micelle were assessed after UHT-heating. By means of measurements regarding dissociation and/or polymerization degree, surface hydrophobicity, water bonding capacity and voluminosity the actual thermally caused variability of the casein micelle was determined. These effects were then correlated with the gel formation characteristics of casein during cheese production. It was concluded that correlation between the renneting properties (regarding relative coagulation time and relative gel firmness) of heated casein dispersions and the heat-induced changes exists. Heat-induced changes can be responsible alone or in a combination with other changes for the impairment of renneting properties. Thus, it could be stated that the thermal changes of the casein fraction are substantially larger than so far assumed, because in presence of the whey protein the effects of both fractions were always overlaid.

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PRESENCE OF AFLATOXIN M1 IN MILK AND MILK PRODUCTS: THE SITUATION IN THE WORLD AND IN TURKEY

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Mycotoxins are fungal secondary metabolites that are potentially carcinogenic, teratogenic and mutagenic. Aflatoxin M_1 is found in the milk and dairy products of animals that have consumed feed contaminated by aflatoxin B_1. Milk and its products are a major nutrient especially for children. Due to thermal stability of this toxin, it cannot be inactivated by pasteurization and autoclaving. Therefore, contamination of milk and its products with aflatoxin M1 must be eliminated. Implementation of effective monitoring programs are very important in order to reduce the exposure and protect consumers from aflatoxin M_1 which will contribute to improvement of health of humans Although, there are some contradictory results in the literature regarding the occurrence of aflatoxin M_1 in dairy products, a number of studies have provided sufficient information concerning the presence of aflatoxin M_1 in dairy products. In this review, different literature were compared regarding the presence and concentration of aflatoxin M_1 in dairy products in the world and in our country to present whether aflatoxin M_1 has a potential risk for human health in Turkey.

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WATER MOBILITY DURING RENNETING AND ACID COAGULATION OF CASEIN SOLUTIONS: A DIFFERENTIATED LOW-RESOLUTION NUCLEAR MAGNETIC RESONANCE ANALYSIS

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Changes in water mobility during renneting and fermentation (acidification) of casein micelle solutions measured by nuclear magnetic resonance (NMR) are presented. The pure casein solutions are produced by means of membrane seperation techniques (microfiltration, diafiltration with combination of ultrafiltration). After that casein solutions (native and ultra-high or UHT-treated) were renneted and fermented directly in the NMR instrument to detect changes in water mobility due to the induced structural changes online. The data were analysed using a newly developed method capable of differentiating several fractions of water in terms of their mobility according tot he relaxation times in four distinct ranges, that is, immobile, weakly mobile, mobile and very mobile. Whereas obvious changes in the water mobility that place during acidification, no changes in the water mobility during renneting were observed. This is explained by proposing a model building on different mechanisms of coagulation between acidification and renneting.

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A COMPARISON OF LOW-INTENSITY ULTRASOUND AND OSCILLATING RHEOLOGY TO ASSESS THE RENNETING PROPERTIES OF CASEIN SOLUTIONS AFTER UHT HEAT PRE-TREATMENT

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Ultrasonic and oscillating rheological methods were applied to investigate the effects of heat pre-treatment at Ultra-High-Temperatures on the rennet gel formation of a whey protein-free casein solutions. Therefore pure casein solutions are produced by means of membrane separation techniques (microfiltration, diafiltration with combination of ultrafiltration). By comparison, the ultrasonic velocity was found to be sensitive to measure the enzymatic hydrolysis by rennet and the following aggregation process, but not as sensitive to detect the formation of a casein gel. In contrast, the oscillating rheological method was not sensitive enough to detect the enzymatic hydrolysis, but more suitable to characterize the formed gel network. A linear correlation was found between the coagulation times determined by these two methods.

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CHEESE POWDER PRODUCTION

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Dehydrated cheese products were developed during World War II to preserve cheese solids under favourable conditions, e.g. temperature > 21 °C for a long period of time. Today, dehydrated cheese products find widespread use mainly in industry as flavouring agents and/or nutritional supplements in a variety of foods including biscuits and other bakery products, sauces, snack coatings, extruded snacks, soups, pasta, cheese dips, processed cheese, ready-made dinners, dehydrated infant meals and convalescent foods. Additionally, cheese powder production provides a chance to recover the lower-grade natural cheeses and/or offcuts from higher-grade cheeses. These trends suggest that an estimated 35-45% of cheese is consumed as an ingredient in other foods. One of the most important types of ingredients is cheese powder; moreover, recent market analyses indicate that the consumption of cheese as an ingredient is growing rapidly. The primary aims of this study are to discuss the properties and importance of cheese powder, to explain the cheese powder production methods and to anticipate the future trends for cheese powder studies.

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THE OPTIMISATION OF TEMPERATURE FOR TRANSGLUTAMINASE ACTIVATION IN PROBIOTIC YOGHURT PRODUCTION

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Transglutaminase (TG) is an enzyme that increases formation of inter- and intramolecular bonds inside milk protein chains, which contributes to formation of firmer gel, decrease of syneresis, improvement of consistency and achievement of smother yoghurt surface. The effect of different temperatures for TG activation on fermentation time, syneresis, water holding capacity and sensory characteristics of probiotic yoghurt has been examined. Yoghurt samples were produced from milk with 0.1% milk fat and addition of thermophylic starter culture DELVO-Yog MY-721 DSL (Lactobacillus acidophilus, Bifidobacterium, Streptococcus thermophilus). In milk TG was added in concentrations of 0.02%, 0.04% and 0.08% with or without activation. Temperatures used for TG activation were: 25°C, 30°C, 35°C and 40°C. It was found that the parameters of transglutaminase activation have a significant effect on fermentation time, syneresis, water holding capacity and sensory characteristics of probiotic yoghurt. Fermentation time was shorter for samples in which TG was activated at lower temperature. On the same temperature water holding capacity was greater, thus syneresis was lower.

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QUALITY OF FUNCTIONAL FERMENTED DAIRY BEVERAGE PRODUCED BY MICROFILTRATED TEA FUNGUS INOCULUM

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Functional food which has positive influence on consumer's health has very important role in modern food industry. Tea fungus is a symbiosis of acetic acid bacteria (Acetobacter, Gluconobacter) and yeast (Saccharomyces, Zygosaccharomyces, Saccharomycodes, Torulaspora) with numerous therapeutic effects on human health. Transglutaminase (TG) modifies the functional properties and changes the physical characteristics of product. The aim of this study was to examine the quality of fermented milk beverages produced from milk with 0.9% fat with application of microfiltrated tea fungus inoculum (MFI) and tea fungus inoculum with addition of transglutaminase in concentration of 0.02%. MFI tea fungus concentrates were added to milk to achieve two concentrations: 10% [w/w] and 15% [w/w]. Probiotic yoghurt was used as a control sample. Physico-chemical and textural characteristics, viscosity and microstructure were analyzed in produced fermented milk beverages. Samples produced by addition of transglutaminase has better physico-chemical and rheological characteristics compared to samples produced without TG due to changes in the structure of yoghurt gel.

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DETERMINATION OF REJECTION LEVELS FOR ACID, PEROXIDE, TYROSINE VALUES AND TITRATABLE ACIDITY IN YAYIK BUTTER

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In this study, the effects of acidity (titratable acidity, pH of serum), lipolysis (acid degree), oxidation (peroxide value) and proteolysis (tyrosine value) on the changes in aroma and flavor of Yayık Butter during storage were investigated. For, produced Yayık Butter samples were stored for 180 days at two different storage temperature (4°C and 15°C) and analysed periodically. The results subjected to path analyze and thereby the determination coefficients of the properties cited above on the changes of aroma and flavor were calculated. According to the results obtained from butter stored at 15 °C, the determination coefficients of the properties of titratable acidity, pH of serum, acid degree, peroxide value and tyrosine value were found as 85.5 %, 34.9 %, 77.9 %, 1.1 % and 16.1 %, respectively. The effects of titratable acidity, pH of serum, acid degree and tyrosine value on aroma and flavor changes were found to be significant ($P<0.01$). According to independent effects of properties, titratable acidity and acid degree value were the best in characterization of aroma and flavor changes. Aroma and flavor impairment become more pronounced on the 100th day of storage and threshold values of titratable acidity and acid degree were determined as 6.19°SH and 1.08 mg KOH / g oil, respectively. The results obtained from samples stored at 4 °C indicated that the shelf – life of Yayık Butter at refrigerator temperature is 180 days or more.

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BIOGENIC AMINES IN CHEESE

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Food can naturally contain potentially harmful substances, as biogenic amines. Biogenic amines are the low molecular weight organic bases with aliphatic, aromatic or heterocyclic structures, formed by microbial decarboxylation of amino acids in fermented food and beverages. After fish, cheese is the next most commonly implicated food item associated with biogenic amines poisoning. As a result of casein degradation, free amino acids accumulate in cheese mass during ripening period. Some of these free amino acids in cheese can be converted into biogenic amines by the activity of bacterial decarboxylases. Biogenic amines accumulation in cheese can be influenced, firstly, by the microbiological quality of raw milk, the sanitization procedures adopted, the use of starter cultures, storage temperature, ripening time, and product characteristics such as salt concentration, moisture and pH. Cadaverine, histamine, spermidine, spermine, tyramine, tryptamine, putrescine and 2-phenylethylamine have been found in many different kinds of cheese. The presence of low levels of biogenic amines in cheeses and other foods is not considered a serious risk. However, if normal routes of amine catabolism are inhibited or the amount consumed is large, various physiological effects may result. Efforts should be made to understand amine formation in cheese in order to optimize technology and secure low amine levels.

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THE USE OF TRANSGLUTAMINASE ENZYME IN DAIRY PRODUCTS

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Transglutaminase (R-glutaminly-peptide:amine g-glutamy transferase, (EC 2.3.2.13)) is a transferase which led to the formation of cross-link in proteins. Transglutaminase (TGase) catalyzes the acyl-transfer reaction between γ-carboxyamid group of glutamine and ε-amino group of lysine residues which led to inter or intramolecular cross-link. TGase in crossling reactions of food proteins have had a strong focus on milk proteins. Caseins especially appear to be readily cross-liking because of their flexible, random-coil structures and the absence of any disulphide bonds in the s_1- and β-casein. Due to their compact globular structures, whey proteins tend to cross-link less efficiently. When applying TGase in dairy products, it is possible to increase gel strength, water holding capacity, stability, emulsifying properties and decrease permeability of milk proteins. One of the major areas of the use of TGase in dairy products is in the productions of yoghurt. The major changes that occur are an increase in gel strength and a decrease in syneresis. TGase is used in manufacturing of cheese, too. Curd yield is increased by using TGase in the manufacturing process. Additionally, improved water holding capacity in fresh, unripened cheese is considered a potential advantage of TGase treatment. Several experiments have also been carried out on quality improvement in frozen dairy desserts. Ice cream treated with TGase is smoother and easier to scoop, especially in the case of low-calorie, nonsugar ice cream.

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COMPARISONS OF PHYSICAL AND RHEOLOGICAL PROPERTIES OF MILK ICE CREAMS CONTAINING HYDROXYPROPYLATED STARCH AND KAPPA-CARRAGEENAN AS STABILIZER

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The effect of interaction between κ-carrageenan and modified starch (hydroxypropylated starch: HP or hydroxypropylated-cross-link starch: HC as stabilizer on the physical and rheological properties of milk ice cream was examined. The final concentration of stabilizer used in each ice cream mix was fixed at 0.3% (w/w) by varying the starches in the range of 0.255-0.3%(w/w). The subtraction of HP or HC concentration from the final one was a percentage of added κ-carrageenan. The mixes were carried out for rheological tests by measuring yield stress (σ0), consistency index (K) and flow behavior index (n), while the ice creams were examined for the overrun, melting rate and hardness. It was found that K and σ0 of mixes containing HP were higher than those of mixes with HC at the same level of HP and HC concentration. Increasing κ-carrageenan concentration gave more σ0 and K but less n value in both HC and HP samples. The overruns of both ice creams containing HP or HC were not significantly different ($p<0.05$). Ice creams containing HP showed less melting rate and hardness compared with those of ice cream containing HC. This showed that the interaction of HP/κ-carrageenan was more suitable to use in milk ice cream than HC/κ-carrageenan.

Keywords: Modified starch; κ-carrageenan; ice cream; rheology

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MICROBIOLOGICAL QUALITY OF ACTIVE DRY AND COMPRESSED BAKER'S YEAST SOLD IN EGYPT

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The microbiological quality for nine brands of active dry yeast (ADY) -indigenous and imported- sold in Egypt were investigated and compared with the Egyptian compressed yeast. In addition, the viability of the yeast cells was estimated. The results showed that the mean counts (log_{10} cfu/g) for the total viable count ranged from 8.70 to 9.59 while enterococci were not detected in any sample. The compressed yeast recorded the worst microbiological quality regarding to its very high microbial load; total coliforms (5.38 log cells/g), Faecal Coliforms (5.25 log cells/g) and *Salmonella* (detected in 50% of the tested samples). On the other hand, ADY recorded better result as percentage of unacceptable samples as fowling; total coliforms (23.3%), faecal coliforms (17.8%) and *Salmonella* (4.4%) most of the unacceptable samples were those made or packed in Egypt. However, ADY recorded a bit higher unacceptable samples regarding to moulds (35.6%), *Bacillus cereus* (18.9%) and *Staphylococcus aureus* (34.4%) while the results of the compressed yeast was for moulds (30%), *Bacillus cereus* (10%) and *Staphylococcus aureus* (20%). Concerning yeast cell viability, the compressed yeast revealed the highest viability (96.9%) while the viability of ADY brands ranged from 23% to 78.3%. All samples of the English ADY met the standards with high microbiological quality and viability (78.3%). This study indicates that baker's yeast could represent notable hazards to humans and maybe a cause for public health concerns.

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THE EFFECT OF SCALLOP SHELL POWDER ON REMOVING BIOFILM FROM STAINLESS STEEL SURFACES

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In this study, the effect of scallop shell powder (SSP) on removing biofilm of three pathogens on stainless steel surface has been investigated. Whey or bench washing water (BWW) from meat processing plant was inoculated with Listeria monocytogenes, Staphylococcus aureus or Escherichia coli O157:H7 (8 log/mL). Stainless steel plates (10 cm^2) were placed in the inoculated fluids and incubated at 20 °C for 48 hours. The plates were dried for 30 min followed by washing 3 times by water. After the plates were dipped in 0, 0.25 or 0.50% SSP slurries for 1 min the number of tested pathogens on the plates was analyzed. The results showed that 0.25 and 0.50% SSP reduced the number of L. monocytogenes on the plates incubated in whey or BWW by 4 log/cm^2. Application of 0.25 and 0.50% SSP also removed S. aureus by 4 and 5 log/cm^2, respectively from the surface of the plates incubated in whey. Furthermore, biofilm of E. coli O157:H7 formed in whey or BWW was cleaned by 4 and 6 log/cm^2 or by 3 and 5 log/cm^2 using 0.25 and 0.50% SSP, respectively. In conclusion, SSP can be an alternative disinfectant for cleaning biofilm of pathogens from stainless steel surfaces.

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THE SURVEY OF SALMONELLA CONTAMINATION IN TRADITIONAL ICE-CREAM IN TEHRAN PROVINCE

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The traditional ice-cream is one the most popular dairy products, that contains high nutritional value. It gets from mixing sugar, milk, cream, nuts, flavor, color and stabilizer agents. According to researches this product has potential foodborne pathogens. Outbreak of salmonellosis has been reported form consumption of ice-cream. It is threatening for public health and can cause vomiting, diarrhea. So, we surveyed the existence of salmonella in traditional ice-cream in Tehran province in summer 2009. 100 samples were bought from different markets in Tehran province, randomly. Briefly 25 gr of each sample homogenized in 225 ml pw 37°c/12h, then cultured to tetrathionate and selinate, SSA and BSA; TSI and LIA, urease (37°c/1-2days) respectively. In this cross sectional survey, %9 salmonella were found (%4 Tehran, % 5 Karaj, 0% Shahriar). The raw materials of traditional ice-cream specially milk and cream maybe contaminated by mastitis or feces of infected animals or human carrier handling and cross contamination. Jay (2005) reported ice-cream is important for salmonellosis affection. Bloomfield (1990) stated contaminated factors such as polluted water, hands, and dirty dishes. So for safety of traditional ice-cream necessary proper pasteurization of raw material, hygienic of handling and health personnel's on serving were used. In standard of Iran, salmonella is zero tolerance in ice-cream.

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MOULDS ISOLATED FROM SPANISH DRY CURED HAM

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Quality of Spanish dry-cured ham depends on numerous factors including the presence of moulds, which have an important effect on hygienic and sensorial quality. Although it is proved that these microorganisms have an important proteolytic and lipolytic activity, essential for sensorial characteristics, it should be realized that many of the moulds also can synthesize mycotoxins which could cause serious health risk for the consumer. The objective of this work was to identify the natural mycobiota occurring in dry-cured ham during the pre-ripening and the ripening phases, paying special attention to the incidence of fungal species that are potential producers of mycotoxins. Fifty-five hams from two manufacturing plants were sampled. A total of 130 fungal strains were identified using sequence analysis of the 5.8-ITS region. The most frequently identified species were Penicillium commune (50%), Talaromyces spectabilis (8%), Aspergillus rubrum (8%), Penicillium polonicum (5%), Penicillium verrucosum (5%), Cladosporium cladosporioides (5%), Eurotium rubrum (5%), Penicillium chrysogenum (3%), Penicillium crustosum (2%), Paecilomyces variotii (2%), Penicillium expansum (2%), Trichoderma citrinoviride (2%) and others species (3 %). Incidence of P. polonicum, P. verrucosum and P. commune is considered to pose a potential risk of mycotoxin contamination such as ochratoxin-A and cyclopiazonic acid in dry-cured ham.

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SURVEY OF THE MICROBIOLOGICAL QUALITY OF CAKES AND PASTRIES SOLD IN SKOPJE, MACEDONIA

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This study investigated the microbiological quality of cakes and pastries sold directly to the consumers in Skopje, Macedonia. Sampling took place in 16 sampling points (bakeries, confectioneries) with total number of 70 samples being investigated. All the samples were tested for S. aureus, Enterobacteriaceae, aerobic colony count, E.coli, Salmonella spp. and Listeria monocytogenes. The samples were tested in the Food microbiology laboratory at the Faculty of veterinary medicine in Skopje using standard accredited methods. Results were interpreted according to the Guidelines for the Interpretation of Results of Microbiological Analysis of Some Ready-To-Eat Foods Placed on the Market (HPA, UK). After the analysis of the results the following data was obtained: S.aureus: 68.57% (n= 48) of the samples were satisfactory, 31.42% (n=22) were acceptable and 0.0% (n=0) were unsatisfactory; Enterobacteriaceae: 60.0% (n= 42) of the samples were satisfactory, 40.0% (n=28) were acceptable and 0.0% (n=0) were unsatisfactory; Aerobic colony count: 51.42% (n= 36) of the samples were satisfactory, 45.71 (n=32) were acceptable and 2.85% (n= 2) were unsatisfactory; Salmonella spp., Listeria monocytogenes and E.coli: None of these microorganisms were detected in the samples taken. High levels of ACC, Enterobacteriaceae and S. aureus reflect unsatisfactory hygienic practice during processing of food from source to table. The established level of acceptable and unsatisfactory results highlight the need for targeted inspection and education program in order to address the potential food safety risk from hygienic practice issues.

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MICROBIOLOGICAL PROPERTIES OF TORBA YOGHURTS SOLD IN İZMIR PROVINCE

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This study was undertaken to determine the microbiological quality of Torba yoghurt sold at local markets in Izmir. A total of 30 Torba yoghurt samples were analyzed. Enumeration of microorganisms was carried out by using appropriate dilutions, specific media and incubation norms. In Torba yoghurt samples, numbers of Lactobacillus bulgaricus and Streptococcus thermophilus were $2.1x10^6$ - $4.1 x 10^9$ cfu/g and $1.0x10^5$ - $7.8x10^8$ cfu/g respectively. The total numbers of proteolytic and lipolytic bacteria, yeast-mould, coliform bacteria, Staphylococcus and Enterococcus ssp. which found in yoghurt as contaminant were $1.1x10^1$ - $5.4x10^4$ cfu/g, $1.1x10^1$ - $2.1x10^4$ cfu/g, $1.4x10^2$-$8.1x10^5$ cfu/g, <10- $7.1x10^2$ cfu/g, <10- $1.6 x 10^3$ cfu/g and <10- $3.6x10^4$ respectively. The number of coliforms and Staphylococcus in 13 samples and the counts of Enterococcus ssp. in 8 samples were found less than 10 cfu/g. It can be concluded that microbiological quality of Torba yoghurt samples were not at desired level. According to the high numbers of indicator bacteria counts, some Torba yoghurt samples were potential risk factor for public health.

Keywords: Torba yoghurt, microbiological properties, quality

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A MODIFIED SELECTIVE MEDIUM FOR THE DETECTION OF PSEUDOMONAS SPP. FROM RAW MILK

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Pseudomonas is an important genus, are frequently found in milk and dairy products. These bacteria are responsible for undesirable flavors, colors, and odors during refrigerated storage because of the proteolytic and lipolytic activity. Several selective media for the detection of Pseudomonas species are produced commercially but unfortunately selectivity of those are inadequate. In this study, it was aimed to develop modified selective medium for the detection of Pseudomonas spp. The composition of GSP Agar was altered by the addition of benzalkonium chloride (BKC) to improve its selectivity for Pseudomonas spp. At first stage, 20 raw milk samples were used and 27 isolates were obtained using GSP Agar. Of the 27 isolates, 8 were identified as Pseudomonas spp., 6 as Aeromonas spp., 6 as Enterobacter spp., 3 as Escherichia spp., 2 as Citrobacter spp. and 2 as Klebsiella spp. At the second stage, effect of BKC on growth of Pseudomonas spp. and competitive flora was determined using agar spot method. BKC at the level of 512 μg/mL inhibited the growth of competitive flora whereas it did not inhibit that of Pseudomonas spp. Evaluation of enumeration results obtained on BKC-GSP Agar revealed that counts of Escherichia spp., Enterobacter spp., Aeromonas spp. and Klebsiella spp. were decreased significantly (89%), Citrobacter spp. was reduced by 48%, although Pseudomonas spp. count was remained unchanged. By the light of all these findings, it was concluded that BKC-GSP Agar could facilitate for detection of Pseudomonas spp. in raw milk.

Keywords: Pseudomonas spp., GSP Agar, raw milk, BC

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THE EFFECT OF BENZALKONIUM CHLORIDE ON GROWTH OF PSEUDOMONAS AERUGINOSA AND COMPETITIVE FLORA ISOLATED

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Benzalkonium chloride (BKC) was added to selective medium Cetrimide Agar to enhance its selectivity for Pseudomonas aeruginosa associated with the spoilage of milk and dairy products. In this study, a total of 55 isolates were obtained from 22 raw milk samples collected from several dairy plants in Ankara. Among these isolates, 26 of them were identified as Pseudomonas aeruginosa, 20 of them as Pseudomonas fluorescens, 5 of them as Acinetobacter baumannii, 2 of them as Enterobacter intermedium, 1 of them as Enterobacter agglomerans, and 1 of them as Escherichia coli using Microbact (Oxoid) biochemical test kit. BKC was chosen as a selective agent to suppress growth of competitive flora because it is very effective against a wide range of both Gram-positive and Gram-negative bacteria while P. aeruginosa is resistant to BKC. Various concentrations of BKC; 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600 ppm were examined to find out the most effective concentration using agar spot method. As a result of this experiment the concentration of 200 ppm of BKC inhibited competitive flora while most of the P. aeruginosa strains were resistant.

Keywords: Pseudomonas aeruginosa, Cetrimide Agar, raw milk, benzalkonium chloride

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ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF THE ESSENTIAL OILS AND METHANOL EXTRACT FROM MENTHA LONGIFOLIA HUDS

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Mentha spp. has been used as a folk remedy for treatment of nausea, bronchitis, flatulence, anorexia, ulcerative colitis, and liver complaints due to its antinflammatory, carminative, antiemetic, diaphoretic, antispasmodic, analgesic, stimulant, emmenagogue, and anticatharrhal activities. This study was designed to evaluate antimicrobial and antioxidant activities of the essential oil and methanol extract from Mentha longifolia ssp. longifolia. Antioxidant activity was evaluated through DPPH assay and Β-Carotene–linoleic acid assay. The essential oil and methanol extract were individually tested (disc-diffusion assay and evaluating minimum inhibition concentration (MIC)) against a number of bacteria. The essential oil showed strong antimicrobial activity against bacteria tested whereas the methanol extract almost remained inactive. In contrast, the extract showed much better activity than the essential oil in antioxidant activity assays employed, e.g. in the inhibition of free radical 2,2-diphenyl-1-picrylhydrazyl (DPPH) and β-carotene/linoleic acid systems. In the former, the extract was able to reduce the stable free radical DPPH with an IC50 of 55.3 μg/ml while that of the oils was 10 630 μg/ml. When compared to BHT, a synthetic antioxidant, both showed weaker antioxidative potential. Similarly, in β-carotene/linoleic acid assay, these samples were not effectively able to inhibit the linoleic acid oxidation; exhibiting only 24% and 36% inhibitions at 2 mg/ml, respectively; both were far below than that of BHT. Total phenolic constituent of the extract was 4.5 g/100 g as gallic acid equivalent. GC–MS analysis of the oil resulted in the identification of 45 constituents, cis-piperitone epoxide, pulegone and piperitenone oxide being the main components.

Keywords: Antioxidant activity, Antimicrobial activity, Mentha longifolia huds

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INVESTIGATION OF AFLATOXIN B1 LEVELS IN RED PEPPER FLAKES, PEPPER PASTES AND PEPPER SAUCES CONSUMED IN ANKARA REGION, TURKEY

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In this study, total number of 190 red pepper products were analysed, consisting 90 pepper paste (salca) from 9 different firms, 50 pepper sauce from 5 different firms and 50 pepper flakes from 5 different firms which were collected from Ankara region, Turkey. Determination of Aflatoxin B1 (AFB1) levels in the red pepper products has been made by immunoaffinity column technique and Enzyme-Linked Immunosorbent Assay (ELISA) procedure. Mean levels (±S.E) of AFB1 was 1.020±0.052 ppb, 1.069±0.117 ppb and 2.197±0.164 ppb in the pepper pastes, pepper sauces and pepper flakes, respectively. For the pepper pastes and pepper flakes the maximum and minimum levels were determined as 2.76-0.23 ppb and 4.87-0.20 ppb, respectively. For pepper sauces, the maximum and minimum levels were determined as 6.12 and 0.52 ppb, respectively and in one sample, AFB1 level exceeded the Turkish Food Codex values (TFC). Our data revealed that AFB1 mean levels found in the pepper pastes, pepper sauces and pepper flakes were within TFC values. As a result, the red pepper products consumed in Ankara region, Turkey do not have any risk on public health. Thus, packaging is thought to be a good measure to supply high quality red pepper products.

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DETERMINATION OF AFLATOXIN M1 LEVEL IN MILK AND WHITE CHEESE CONSUMED IN ANKARA REGION, TURKEY

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In this study, total number of 220 milk and cheese samples were analysed, consisting 120 pasteurised milk from 8 different firms, 30 raw milk and 70 Turkish white brined cheese samples from 7 different firms, which were collected from Ankara region, Turkey. Aflatoxin M1 (AFM1) was determined with an enzyme linked immunosorbent assay (ELISA) using the I'screen Afla M1 ELISA kit. Mean levels of AFM1 was 0.025±0.003 ppb in the milk samples. Regarding the Turkish white brined cheese samples, mean level of AFM1 was found to be 0.023±0.004 ppb. Our data revealed that while mean AFM1 levels found in pasteurised milk of two firms were higher than Turkish Food Codex (TFC) value, for the other milk was within TFC value. In raw milk and cheese samples all the AFM1 levels were within the TFC value. In our study 70 cheese samples were investigated and in none of the samples AFM1 levels exceeding the TFC value were determined, thus these cheese samples does not represent a risk for public health. However, in pasteurised milk 12.5% of the samples exceeded the TFC value and are thought to be an important risk for public health especially for infants.

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DISTRIBUTION OF ENTEROBACTERIACEAE SPECIES ISOLATED FROM CONVENTIONAL AND BROILER CHICKEN, COMPARISON OF ANTIBIOTIC RESISTANCE PROFILES

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Enterobactericeae with multiple antibiotic resistances can cause infections that are difficult to treat. Four-geographical areas account for over 90 % of world poultry-meat production. The forces driving production differ and a discussion of these within each market illustrates the evolving nature chicken-meat production. Antibacterial treatment will not usually eliminate all infecting microorganisms from treated subjects; however it can be a supplementary tool in sanitation or eradication programmes. Intensive use of antibiotics in an eradication programmes in a small number of birds in the higher levels of the breeding pyramid can reduce total antibiotic usage; Following several amendments, directive about the banned hormones, antibiotic growth promoters, anticoccidials and drugs in compound animal feed in Turkey. Enterobactericeae which causes economical losses and closely related to public health of importance in poultry enterprise in Adana region and it was concluded that the treatment of the disease has to be made by determination of effective antibiotic groups and contaminated meat, chicken products are risk factors for food poisoning. In conclusion, it was demonstrated that the highest natural and plasmids dependant resistance was found against the antibiotics; Penicillin, Amphisilin, Tetracyclin, Chloramphenicol, Tobramycin, Imipenem, Sxt, Vancomycin, Basitracin, Eritromycin.

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RAPID DETERMINATION OF SOME MICROBIOLOGICAL PROPERTIES OF TULUM CHEESES BY TEMPO® SYSTEM

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Tulum is a traditional semi-hard cheese produced in Turkey. It is manufactured from sheep's, goat's and cow's milk or their mixture. Name of the tulum originates from the casing material used in traditional tulum cheese production. The tulum cheese is ripened in the goat or sheep skin. Nowadays, tulum cheese is commonly ripened in plastic barrels instead of the goat or sheep skin. The aim of this study was to evaluate microbiological quality of the tulum cheeses. A total of 47 tulum cheese samples were obtained from local markets in Istanbul. The enumeration of total mould and yeast count, total coliform and coagulase (+) *Staphylococcus aureus* was performed with TEMPO® System. TEMPO® System is an automated cell count system and based on Most Probable Number technique, reduces the analyzing time and provides automated reading, calculation of counts and storage of data. The total mould and yeast, total coliform and coagulase (+) *Staphylococcus aureus* count were within the range of ‹100 - ›$4.9.10^5$ cfu/g, ‹10 - ›$4.9.10^4$ cfu/g, ‹10 -10 cfu/g, respectively. Eighty five percent of tulum cheese had total mould and yeast count exceeding the Turkish Food Codex limit of total mould and yeast in cheeses.

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THE EFFECT OF DIFFERENT CONCENTRATIONS OF LITHIUM CHLORIDE (LiCl) ON THE GROWTH OF LISTERIA MONOCYTOGENES IN FRASER BROTH

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In recent years lithium chloride has been added to the growth media to obtain sufficient selectivity. Although *Listeria monocytogenes* is susceptible to many common antibiotics and inhibitor substances, it is intrinsically resistant against LiCl. The use of LiCl as a competitor inhibitor is crucial and could be helpful in inhibiting competitors (*Enterococcus* spp.) when recovering stressed *Listeria monocytogenes*. The aim of this study was to investigate the susceptibility to LiCl of 18 of *Listeria monocytogenes* strains isolated from foods. For this purpose, Fraser Broths containing 3.0, 10.0, 15.0 and 20.0 g/L LiCl were used. After incubation at 37 °C for 24 hours all strains were inoculated PALCAM and TSYE agar by the spread plate technique. All inoculated plates were incubated at 37 °C for 48 hours. After incubation, typical colonies were counted from the PALCAM and TSYE agar and results were evaluated by statistical analysis. According to results, the effect of LiCl on microbial growth was found statistically different in between PALCAM and TSYE Agar. But it was determined that different rates of LiCl in both mediums had the same effect on the bacterial count. Significant differences ($p<0.05$) weren't found for the medium containing 3 g/L LiCl and 10 g/L LiCl while the difference between 15 g/L and the others were important. Consequently, 10 g/L of LiCl was determined as ideal concentration in Fraser Broth.

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EFFICACY OF SATUREIA MONTANA L. ESSENTIAL OIL AS ANTIMICROBIAL AGENT AGAINST CAMPYLOBACTER JEJUNI CECT 7572 IN CHICKEN MEAT

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Campylobacter jejuni (*C. jejuni*) is common bacterial pathogen that causes gastroenteritis in humans worldwide. In Algeria, campylobacteriosis is the leading food-borne bacterial illness, and the consumption of chicken meats and/or by-products is suspected to be the major cause of this illness.
The aerial parts of *Satureia montana L.* (*S. montana*), were collected at Kabylie province (Algeria), in March-July 2009. The essential oil was obtained from dried plant parts by hydrodistillation in a Clevenger-type apparatus for 3 h (SAIDAL, Filiale Biotic, Algiers). The essential oil obtained was separated from water and dried over anhydrous sodium sulphate (Na_2SO_4) and preserved in darkness in a sealed vial at 2±1°C until use. The chemical composition of the essential oil was analyzed using a Gas Chromatography/Mass Spectrometry (GC-MS) technique. Various components were determined and identified by GC and combined GC-MS (CRAPC, USTHB, Algiers), representing about 95% of the oil of *S. montana*. The main constituents of the essential oil are g-terpinene, thymol, carvacrol and paracymene.
S. montana L. oil fraction was screened for their ability to inhibit the growth of selected *C. jejuni* CECT 7572 using the standard agar-disk diffusion assay. According to the results, *S. montana* essential oil exhibited antimicrobial activity against *C. jejuni.* Results obtained from disc-diffusion method, followed by measurements of Minimal Inhibition Concentration (MIC), indicated that *S. montana* is most active, with the lowest MIC value against *C. jejuni* (6ml/ml). *S. montana* essential oil was tested in chicken meat stored at 5±2ºC, experimentally inoculated with foodborne pathogen at level of 2×10^5 cfu/g. A *C. jejuni* counts in treated samples were 0.7- 4.74 $\log_{10}$ cfu/g less compared to controls at different intervals during storage. The results revealed the potential of *S. montana* oil as a natural preservative in chicken meat.

Keywords: Satureia montana, essential oil, *Campylobacter jejuni*, antimicrobial activity, chicken.

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PREVALENCE AND ANTIMICROBIAL RESISTANCE OF LISTERIA SPECIES ISOLATED FROM TRADITIONAL DAIRY PRODUCTS IN IRAN

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A surveillance study was carried out to determine the prevalence of Listeria spp. in traditional dairy products in Chahar Mahal & Bakhtyari province, Iran. From February 2009 to February 2010, a total of 290 samples of various traditional dairy products were obtained from randomly selected retail stores located in 6 major cities of Chahar Mahal & Bakhtyari province, Iran. Using cultural method, 21 samples (7.2%) were positive for Listeria spp. The highest prevalence of Listeria was found in traditional ice-cream (16.7%), followed by cheese (15.0%), butter (7.5%), and kashk (2.2%) samples. The overall prevalence of Listeria was 7.2%, in which L. innocua was the most species recovered (66.7%); the remaining isolates were L. monocytogenes (23.8%), L. murrayii (4.8%) and L. seelgeri (4.8%). All 5 Listeria strains identified as L. monocytogenes were also positive using polymerase chain reaction (PCR). Susceptibilities of 21 strains were determined for nine antimicrobial drugs using the disk diffusion assay. Overall, all of the Listeria isolates were resistant to one or more antimicrobial agents. Ten strains (47.6%) were resistant to single antimicrobial and 5 strains (23.8%) showed resistance to two antimicrobial agents. Multi-drug resistance was found in 28.6% of Listeria strains. Resistance to nalidixic acid was the most common finding (85.7%), followed by resistance to penicillin (47.6%), and tetracycline (33.3%). The results presented in this study indicate the potential risk of infection with Listeria in people consuming unpasteurized dairy products.

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BIOFILM FORMATION BY LISTERIA MONOCYTOGENES STRAINS

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Biofilms, the three dimensional matrix of extracellular polymeric substances (EPS), are regarded as important with respect to the survival and growth of microorganisms in food-processing environments. Besides, biofilms that are not removed by cleaning provide attachment sites for microorganisms newly arrived to the cleaned system and this formation can cause the impairment of heat transfer and corrosion to the metal surfaces. *Listeria monocytogenes* is one of the important bacteria which can be able to attach and colonize to the environmental surfaces by producing biofilms that protect them against environmental stress. It is known that this strain can survive and grow in biofilms on stainless steel, plastic, and polycarbonate surfaces and many other food contact surface materials. Previous researches demonstrated that the cell attachment and biofilm formation by *L. monocytogenes* are influenced by the several factors, including characteristics of strains, physical and chemical properties of the substrate for attachment, growth phase of the bacteria, temperature, growth media, and the presence of other microorganisms. Therefore, current researches focus on improving the methods over preventing initial biofilm formation, controlling growth, and eliminating developed biofilms.

Keywords: *Listeria monocytogenes*, biofilm formation

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DETERMINATION OF ANTIBIOTIC RESISTANCE PATTERN AND BACTERIOCIN SENSITIVITY OF LISTERIA MONOCYTOGENES STRAINS ISOLATED FROM DIFFERENT FOODS IN TURKEY

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Listeria monocytogenes is one of the most important food-borne pathogens due to its widespread distribution in nature. The antibiotic resistance of the pathogen is a significant public health concern. Bacteriocins produced by lactic acid bacteria have been known to inhibit the growth of *L. monocytogenes*. Therefore, the aim of the current study was to determine the antibiotic resistance pattern and bacteriocin sensitivity of *L. monocytogenes* strains isolated from different foods. Of the 18 *L. monocytogenes* strains screened in this study, 14 strains were isolated from different foods, including raw and cooked samples, while 4 strains were from our culture collection. With disc diffusion assay, all eighteen *L. monocytogenes* strains were susceptible to the antibiotics, including Penicillin G, Vancomycin, Tetracycline, Chloramphenicol, Rifampicin, Erythromycin, Gentamicin and Trimethoprim. In addition, 94% of them were sensitive to Streptomycin and 89% of the strains were resistant to Fosfomycin. The results of well diffusion assays showed that all strains were inhibited by the cell-free supernatant of a bacteriocin-producing strain, *Pediococcus acidilactici* 13, with the inhibition zones ranging from 12 to 25 mm. These results provide useful information on antibiotic resistance of *L. monocytogenes* strains isolated from foods, and can potentially be used to develop bacteriocin-based interventions to guard against the hazards associated with *L. monocytogenes* in ready-to-eat meat and poultry products.

Keywords: *Listeria monocytogenes*, antibiotic resistance, *Pediococcus acidilactici*, bacteriocin

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A SURVEY ON YEAST FLORA IN CONSUMED DOOGHS IN CITY OF TEHRAN

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Doogh (mixture of water, salt and yogurt) is one of the traditional beverages consumed in Iran and Middle East. Healthiness of this dairy product is of great importance, because all people from various age groups particularly children and elderly have it in their diet. Therefore as many as 100 samples collected from five districts of the city (north, south, east, west and center) were tested. To identify the fungi flora in the dooghs consumed in Tehran. First, dilutions of 10^{-1}, 10^{-2}, 10^{-3} and 10^{-4} were obtained by adding saline solution to the samples and Sabouraud Dextrose Agar medium + Chloramphenicol was used as the basic medium. Then, the plates containing the culture were incubated in a temperature of 23-25 °C for a period of 3 to 5 days so that the colonies in the culture could grow. Using morphological diagnostic methods based on division media such as choromagar, corn meal agar + tween 80, malt agar, BHI along with physiological diagnostic method such as using assimilation test, urea absorption test, Glucose, Galuctose, Trehaloz maltose Xilouz, the level of fungal contamination in the samples were identified. Results indicated that most fungi growing in the culture are of candida spp. with 32. 81% and the least are of, Trichosporon and Debaryomyces type with 3. 125%.

Keywords: Doogh, yeast, flora and Tehran

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THE IDENTIFICATION OF ENTEROBACTER SP. ISOLATED FROM VARIOUS FOODS IN ANKARA-TURKEY

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The *Enterobacteriaceae* family is one of the important bacterial indicators of insufficient heat treatment and inappropriate storage conditions during food processing as it is declared by the commission regulation of European Commission (Regulation No:1441/2007). In this study, *Enterobacter* sp. isolations were made from several food ingredients which are most common raw materials of home-made infant food in Ankara-Turkey. These 5 samples which are rice flour (2 samples), semolina (1 sample), oat flour (1 sample) and rye flour (1 sample) were purchased from markets and local herbalists. The 18 suspect colonies from the VRBG agar (Merck, Germany) plates were subcultured to Tryptic Soy Broth (TSA, Merck, Germany). Only 7 of the isolates could be identified; 6 of them (%33) were found to be *Enterobacter agglomerans*, 1 of them (%6) was found to be *Serratia grimes*. The presumptive identification of the isolates was further analyzed using commercial phenotyping kits (API 20E and ID32E, Biomerieux, France), which revealed considerable discrepancies between them. Therefore the isolates were analyzed by genotyping. Six strains were positive for *Cronobacter sakazakii* using the previously published rpoB PCR probe scheme. However these strains were identified as *Pantoea deleyi* using 16S rDNA sequence analysis. The conclusion was that of the 18 strains that had been isolated a significant number had been misidentified using both conventional phenotyping, and recent genotyping schemes. The mis-identity of non-pathogens as *Cronobacter sakazakii* could lead to unnecessary product withdrawal, loss of consumer confidence, loss of market and regulatory agency investigation. Therefore caution must be used when interpreting identification schemes which are based on non-DNA sequence schemes.

Keywords: *Enterobacter* sp., biochemical identification, genotyping, 16S rDNA sequence analysis.

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MAIN COMPONENTS USED FOR MICROENCAPSULATION OF PROBIOTICS

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The health benefits of probiotic bacteria on human and animals have proved by many researchers. Probiotic bacteria and their products have a worldwide popularity but on the other hand, they have weak viability in products especially in fermented food products as well as gastrointestinal conditions.
Probiotic bacteria should survive in certain numbers (10^6-10^7 cfu/g) throughout gastric passage in order to transfer their probiotic effects to body. However, analysis of probiotic products in many different countries have showed that probiotic strains exhibit poor survival in traditional fermented dairy products and simulated gastric juices. Therefore, the weakness of survival of probiotics in such environments encouraged the researchers to find an efficient way in order to improve the survival of probiotics. Microencapsulation of probiotic bacteria is the newest and most common interest for researchers and the major aim of microencapsulation of probiotics is to survive them under harsh environment of product (low pH, oxygen) and the high acid and bile conditions of gastrointestinal system because of their sensitivity to these conditions.
There are many microencapsulation materials for the immobilization of microorganisms especially probiotics such as; alginate, chitosan, κ-carageenan, xanthan gum, gellan, locust bean gum, gelatin, cellulose acetate phethalate, casein and starch.
This review deals with the main components used for microencapsulation of probiotics and advantages and disadvantages of those encapsulation materials in details.

Keywords: Microencapsulation, probiotics, encapsulation materials, survival, gastrointestinal conditions

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EFFECT OF ORGANIC ACIDS ON ESCHERICHIA COLI O157:H7 AND STAPHYLOCOCCUS AUREUS CONTAMINATED MEAT

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Appropriate and safe antibacterial agents able to decontaminate meat surfaces have long been a big concern in meat industry. In an attempt to manage beef carcass contamination, spray wash treatments utilizing three concentrations (1, 1.5 and 2%) of acetic, lactic, propionic and formic acids were performed to evaluate their efficacy in reducing numbers of Escherichia coli O157:H7 and Staphylococcus aureus on meat tissues. The procured beef pieces of freshly slaughtered animals were first decontaminated with hot water and then inoculated with E. coli O157:H7 and S. aureus individually which then were spray washed with organic acids separately. The total plate count of the treated samples showed that the populations of bacteria decreased after being exposed to these organic acids. Spray wash of formic acid showed the highest reduction for both bacterial species on meat surfaces studied. Significantly, higher log reductions were obtained for S. aureus than E. coli O157:H7. Thus, organic acids are shown to be safe, simple, cheap and highly effective in decontaminating meat surfaces which can be highly recommended for industrial application.

Keywords: Meat, beef, Escherichia coli O157:H7, Staphylococcus aureus, acetic acid, lactic acid, propionic acid, formic acid.

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THE EFFECT OF SALT ADAPTATION ON SALT RESISTANCE OF ESCHERICHIA COLI O157:H7

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E. coli O157:H7 is a major foodborne pathogen, which causes haemorrhagic colitis, and haemolytic uremic syndrome in humans. The use of salt to lower the water activity is one of the methods of food preservation used by the food industry. However, the ability of *E. coli* O157:H7 to adapt and survive in high concentrations of salt makes it difficult to control the pathogen in foods. *E. coli* O157:H7 can survive in NaCl concentration as high as 6.5%. In this study, activated *E. coli* O157:H7 cultures were inoculated into Tryptic Soy Broth (TSB) and incubated 37 ºC for 14 h. The cultures were centrifuged and cells were washed with phosphate-buffer saline (PBS). Washed cells were suspended in TSB containing 3.5% NaCl. Following incubation at 37 ºC for 1 h, cells were centrifuged. The ability of cultures to survive high salt concentration were examined by inoculating PBS containing 8% NaCl. The cultures were incubated at 4 ºC and 25 ºC. Viable counts determined for 1 to 25 days. As a result, while salt resistance of *E. coli* O157:H7 which was kept at 25 □C was increased, there wasn't any increasement of the resistance of the culture incubated at 4 □C. Therefore, the salt adaptation response of microorganisms, which has important implications for food safety, should be considered when food preservation methods are developed.

Keywords: *E. coli* O157:H7, salt adaptation

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THE INHIBITORY EFFECT OF NANOCID AGAINST STAPHYLOCOCCUS AUREUS AT DIFFERENT TEMPERATURES

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Nanoscale materials especially nanosilver have emerged up as novel antimicrobial agents owing to their high surface area to volume ratio and the unique chemical and physical properties. The aim of this study was to evaluate the effect of different concentrations of silver nanoparticles on the growth of *Staphylococcus aureus* at three different temperatures (35, 20 and 5 ˚C) during 10 days. Different concentrations of nanosilver (12.5, 25, 50, and 100 ppm) were inoculated with bacterial suspension and incubated for 10 days at three different temperatures (35, 20, and 5 ˚C). Bacterial samples were taken every day and the colony count was carried out by standard plate count. All concentrations of nanosilver had an inhibitory effect on bacterial growth at all temperatures examined. At 35 ˚C, concentrations containing 12.5, 25, and 50 ppm nanosilver induced 1 log reduction in bacterial growth comparing to the control group at the first day and the bacterial count reached to the control by the second day. A bactericidal effect was observed in concentrations containing 50 and 100 ppm nanosilver, at 20 ˚C. At 5 ˚C, although no bacterial proliferation was seen at control, the bacterial count in treatment groups reduced by the first day. The bactericidal effect from higher concentrations of nanosilver was greater at 20 ˚C comparing to 5 ˚C. Nanosilver used in this study showed a strong inhibitory effect against *Staphylococcus aureus* and this effect increased when the temperature decreased.

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INHIBITION OF BACILLUS CEREUS BY ESSENTIAL OILS FROM TWO AROMATIC PLANTS

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At the present, there is an increasing attention, both in industry and academic research, to medicinal and aromatic plants for their antimicrobial properties against food-borne pathogens and food spoilage microorganisms. This study was designed to evaluate the effect of essential oils (EOs) from *Zataria multiflora Boiss*. and *Mentha pulegium* against a food-borne pathogen, *Bacillus cereus*. The antibacterial activity of these EOs was evaluated by assessment of the minimum inhibitory concentration (MIC) using macro-dilution and micro-dilution broth methods according to the NCCLS. The MIC value of *Z. multiflora* Boiss. EO against Bacillus cereus was estimated 0.04 % (v/v) using both macro and micro-dilution. Furthermore, the MIC value of *M. pulegium* EO were obtained 0.16 % and 0.32 % (v/v) using macro and micro-dilution broth, respectively, indicating less inhibitory effect of this EO comparing to Z. multiflora Boiss. EO. In conclusion, the EOs from *Z. multiflora* and *M. pulegium* were shown to be effective against bacterial growth and the potential application of them in food systems, may be suggested.

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CHEMOPREVENTION OF AFLATOXIN PRODUCTION BY ZATARIA MULTIFLORA BOISS. ESSENTIAL OIL

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The growth of the fungi on the food stuff is a serious problem that causes significant economic losses due to food spoilage, and nutritional and chemical changes resulting in reduction of its quality and quantity. The aim of this study was to investigate the effect of Zataria multiflora Boiss. Essential oil (EO) against growth and aflatoxin formation by Aspergillus flavus in synthetic media. Briefly, broth medium containing different concentrations of EO was inoculated with spore suspension followed by incubation for 10 days, filtration of culture, and drying and weighing mycelia mass. Determination of aflatoxins (AFB_1, AFB_2, AFG_1, and AFG_2) in filtrates was performed by RP-HPLC. The oil significantly suppressed mycelial growth and aflatoxin synthesis in broth medium at all concentrations tested ($P < 0.05$). At 50 ppm, EO showed only a moderate reduction (22.6%) in mycelial dry mass, while inhibition was substantial at 100 and 150 ppm (82% and 90%, respectively). Furthermore, the EO had a significant inhibitory effect on aflatoxin formation, which was reduced by 31% and 99.4% at 50 and 150 ppm, respectively. The results suggested the potential substitution of the antifungal chemicals by Zataria multiflora Boiss EO as a natural inhibitor to control the growth of molds and aflatoxin production in foods.

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BACTERIAL QUALITY OF BOTTLED WATER FROM DOMESTIC BRANDS IN TEHRAN MARKET, IRAN

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Transmission of waterborne disease is a major concern of public health and it is important to know microbial quality of bottled water. This study was conducted about bacteriological evaluation of bottled water from domestic brands in Tehran market. 35 samples of bottled water were collected randomly from seven different brands. The samples were examined about Heterotrophic plate count (HPC) bacteria, coliforms and E. coli according to standard methods for examination of water. Results showed that the mean and standard deviation of HPC bacteria in examined samples were 3.14×102 and 2.07×10^2 cfu/ml, respectively. HPC was ranged from $2.4\times$ 101 to 9.50×10^2 cfu/ml among bottled water examined. Total coliform bacteria were detected in 14.28% bottles of mineral water. None of the bottle samples was positive for fecal coliforms and Escherichia coli. The presence of coliforms in bottled water suggests the potential of pathogenic enteric microorganisms and it requires an improved surveillance system in production of bottled water.

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DEVELOPMENT AND APPLICATION OF PCR BASED METHOD FOR THE RAPID DETECTION OF ENTEROBACTER SAKAZAKII IN INFANT FORMULA

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Enterobacter sakazakii is an opportunistic pathogen that causes meningitis, bacteraemia and necrotizing enterocolitis in neonates. Powdered infant formulas have been implicated as the source of *E. sakazakii* in several cases. *E. sakazakii* was reclassified as a novel genus *Cronobacter* with recent taxonomic analyses. In this study, a modified PCR based protocol was employed for direct detection of *E. sakazakii* both without enrichment and with enrichment in infant formulas. Different levels of *E. sakazakii* were inoculated into reconstituted powdered infant formula. Detection limit of PCR assay for *E. sakazakii* was determined to be 100 cfu/mL in without enrichment application and 1 cfu/mL after 4-h of enrichment step in infant formula. The result show that the modified PCR based technique described in this study was found more effective, rapid, and sensitive than the conventional methods for detection of *E. sakazakii* from infant formula.

Keywords: *E. sakazakii*, infant formula, PCR, rapid detection

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EFFECT OF GAMMA RADIATION ON LISTERIA MONOCYTOGENES ATCC 7644 AND ESCHERICHIA COLI ATCC 13076 INOCULATED ON MINIMALLY PROCESSED CARROTS

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Fresh carrots are the components of various Turkish salads such as season salad or Mediterranean salad. A local market survey of fresh carrots showed large variation in the bacterial load (3.78-6.68 log cfu/g), mold and fungi (4.40-6.86 log cfu/g) and coliform bacteria (0.32-4.04 log MPN/g). The shredded carrots were irradiated with gamma source at room temperature to determine the radiation sensitivity of the inoculated strains of Listeria monocytogenes ATCC 7644 and Escherichia coli ATCC 13076 and the effect of the recommended radiation dose on the storage period and sensory attributes. The reduction of the microbial population during processing and the D10-values for Listeria monocytogenes and Escherichia coli inoculated on shredded carrots as well as the sensory evaluation of the irradiated product were evaluated. Low dose irradiation (1 kGy) was effective in eliminating Listeria monocytogenes and Escherichia coli with no evidence of re-occurrence and adverse effect on sensory attributes during the storage period.

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SURVIVAL OF LACTIC ACID BACTERIA IN FETA CHEESE SUPPLEMENTED WITH FERMENTED WHEY PROTEIN CONCENTRATE

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Utilization of whey as incorporation of fermented whey protein concentrate (FWPC) in different food products is a simple and economical way, which seems to be applicable method for utilization of whey to increase the yield, biological value, and other qualities of cheese. Since, the major objective of this study was to utilize the nutrients being wasted in the whey in Feta cheese and to evaluate the effects of FWPC on microbiological quality of Feta cheese during 6 months ripening and storage. FWPC prepared from whey obtained during Feta cheese making was added at different levels 5, 10, 15, and 20% (v/v) after (A) or before (B) formation of cheese curd and A5% and B10% were selected as the best substitution levels. These selected cheese samples were examined for microbiological analysis by pour plating technique according to the procedure of American Public Health Association (APHA). Microbial enumeration of samples was done by total colony count of bacteria and lactic acid bacteria (LAB). Supplemented cheeses had significantly higher TC and LAB count than control. The microbiological quality of cheeses was also significantly affected by the storage period. The counts of bacteria and LAB in all the cheeses significantly increased during ripening and reached to a maximum level after one to two month of storage and afterwards significantly decreased. Counts of lactobacilli in all Feta cheeses were higher than lactococci after ripening and this was more obvious at the late of storage period.

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CONTAMINATING MICROBIAL FLORA IN COMMERCIALLY AVAILABLE BAKED POTATO CHEESE AND BUTTER USED AS INGREDIENTS IN ISTANBUL

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The aim of this study was to investigate the microbiological profile of 122 samples of commercially available kashar cheese (42), butter (42) and baked potato (38) having only cheese and butter. This goal was achieved by testing for total coliform counts, for Escherichia coli counts, for the presence of other enterobacteriaceae family members, for Staphylococcus aureus and coagulase positive S. aureus counts, for total mould/yeast counts, for Clostridium perfringens counts and by testing for certain food-borne pathogens according to Turkish Food Codex Microbiological Standards. The pathogen Listeria monocytogenes was not detected in any of the butter and baked potato samples, while it was identified in three of the cheese samples. But other Listeria species which are L. ivanovii and L. innocua were found in butter samples. The Salmonella spp. was not observed in any of the analysed samples, however other enterobacteriaceae family members was isolated from all of the samples. As a result of this study 90.5% of the kashar cheese samples, 52. 4% of the butter samples and 44.7% of the baked potato samples bacteriological quality which were consumed in Istanbul were determined to be unacceptable and did not comply based on the Turkish Food Codex Microbiological Standards. Results from this study suggested that good-hygienic practices aimed at minimizing bacterial counts on preparation surfaces and used instruments be controlled as these may be reservoirs for bacterial contamination of kashar cheese, butter and ready to eat foods in Istanbul market.

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BIOACTIVITY OF WHITE WILLOW AND QUINCE LEAVES CONSUMED AS HERBAL TEA

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In this study, total phenolic contents, antiradical and antimicrobial activities of white willow (*Salix alba* L.) and quince (*Cydonia oblonga* Mill.) leaves commonly consumed as herbal tea in Turkey were investigated. Total phenolic content of samples were determined using the Folin–Ciocalteu colorimetric method and DPPH (2,2-diphenylpicrylhydrazyl) method was used for estimating antiradical activity. The total phenolic contents of white willow and quince leaves were found as 69.44±3.10 and 137.74±0.59 mg gallic acid equivalent (GAE)/g, respectively. Antiradical activity of the leaves was detected as 19.37 IC50 (μg/mL) in white willow leaves and 9.54 IC50 (μg/mL) in quince leaves. Antibacterial activities of the methanolic leave extracts against twelve bacteria were investigated at 1, 2, 5 and 10% concentrations by agar diffusion method. The willow leave extract against *S. aureus* and *S. typhimurium*, and the quince extract against *Y. enterocolitica* had high antibacterial activities. As a result, while antimicrobial activity and total phenolic content of the white willow extract were higher than those of the quince extract, antiradical activity of the quince extract was higher than that of the white willow extract.

Keywords: White willow, quince, herbal tea, antiradical, total phenolic

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COMBINED EFFECT OF ZATARIA MULTIFLORA BOISS. ESSENTIAL OIL AND NISIN ON TTD OF E. COLI O157:H7

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Due to limitation of using the chemical food preservative because of their inordinate applications, many researches have been done to substitute their with naturally occurring compounds, specially plant essential oils and bacteriocins. In this study multifactorial combined effects of three concentrations of Zataria multiflora Boiss essential oil (0,0.03, 0.06 %) and three concentrations of Nisin (0,0.5, 2.5 μg/ml) adjusted by three incubation temperatures (10, 25, 35 ^{o}C) on the time to detection (TTD) of E.coliO157:H7 was evaluated in BHI broth during 43 days. The essential oil acquired by steam distillation. Nisin stock solution was prepared with 0.02 mol l^{-1} HCl and was filter sterilized through a 0.45 μm sterile filter. The tubes containing different concentration of EO and nisin was inoculated with 20μl of bacterial suspension(10^{7}cfu/ml). The inoculated tubes were incubated at 35, 25 and 10 °C for up to 43 days and observed for visible growth at 18 time intervals (1, 2, 3 , 4, 5, 6, 7, 8, 13, 16, 19, 22, 25, 28, 31, 34, 37 and 43 days). This study showed that The TTD was significantly affected ($p<0.01$) by the different concentrations of Zataria multiflora Boiss. essential oil, the strong inhibitory action was observed by increasing EO concentration in all temperature in 43 days,whereas synergistic effects of different concentrations of Zataria multiflora Boiss. essential oil and nisin wasn't significant ($p> 0.05$) compare with using the EO alone and nisin wasn't significantly ($p>0.05$) affect on the TTD compare with control conditions.

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THE MICROBIOLOGICAL QUALITY CONTROL OF FISHERY PRODUCTS SOLD IN TURKISH SUPERMARKET

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The quality control of fishery products is very important for our safety. Fish and fishery products spoil very quickly because of high levels of aminoacid contents, high levels of water activity and the pH level etc. For this reason it is very important that fishery products sold in supermarkets must be controlled frequently. Because these seafood products are ready to eat products. If heat treatment or processing are not enough to destroy pathogenic bacteria and spoilage bacteria, microorganisms will increase during the storage period. High levels of bacteria can be risk for people. In this condition it is possible to occur foodborne illness and infections. In this study a total of 50 samples of processed seafoods (smoked fish, octopus, fish and shrimp marinades, seafood salads, salted fish, ançuez, tarama, stuffed mussels, fish caviars) were taken from the Turkish supermarket for analyzing some microorganisms (Aerobic, Coliform, Escherichia coli, Enterobactericeae, yeast and moulds counts, Staphylococcus aureus bacteria counts).The purpose of this study was to determine hygienic quality of fishery products sold in Turkish supermarket by using 3M Petrifilm fast method.

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ISOLATION OF LACTIC ACID BACTERIA FROM VARIOUS DAIRY SOURCES

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In this research, total 698 isolates was obtained from raw milks (n= 15), traditional yoghurts (n= 7) and raw milk cheeses (n= 9). The incubation temperature of the MRS Agar and M17 Agar dishes for the isolation of lactic acid bacteria (LAB) was 28-30 °C or 37 °C, depended the raw materials and target bacteria. Total 183 of 698 isolates were pre-identified as; *Lactobacillus (Lb) bulgaricus/ helveticus* (12); *Lactococcus (Lb) lactis/ acidophilus* (16); *Lc. casei* (6); *Lb. brevis/ plantarum* (40); *Lc. lactis/ diacetylactis* (28); *Lc. cremoris* (2); possible *Streptococcus thermophilus* (21) and Enterococci (58) according to biochemical and physiological tests. The rest isolates were not LAB; yeast was dominant flora. After determining the proteolitic activities and acid producing abilities, LAB suitable for to be starter culture will be confirmed with advanced methods. At the second step, LAB will be tested in the different combinations for producing naturally dairy products. Phage resistance, suitability for industrial scale starter culture producing, genetically stability etc tests will be applied at the further stages.

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THE EFFECT OF ZATARIA MULTIFLORA BOISS. ESSENTIAL OIL AND NISIN ALONE AND IN COMBINATION ON LISTERIA MONOCYTOGENES

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The excessive use of chemical preservative, many of which are suspected because of their potential carcinogenic and teratogenic attributes or residual toxicity,has resulted in increasing pressure on food manufacturers to substitute of them by natural ones e.g. nisin and Zataria multiflora Boiss .The study of effects of plant essential oils on different growth kinetic of food borne pathogens or food spoilage microorganism in different model systems is requested to establish the usefulness of them as a natural antimicrobial preservatives. Due to limitation of using the chemical food preservative because of their inordinate applications, many researches have been done to substitute them with naturally occurring compounds, especially plant essential oils and bacteriocins. In this study multifactorial combined effects of three concentrations of Zataria multiflora Boiss essential oil(0,0.03, 0.06 %) and three concentrations of Nisin (0,0.5, 2.5 μg/ml) adjusted by three incubation temperatures (10, 25, 35 ^{o}C) on the time to detection (TTD) of Listeria monocytogenes was evaluated in BHI broth during 43 days. The essential oil acquired by steam distillation. Nisin stock solution was prepared with 0.02 mol l−1 HCl and was filter sterilized through a 0.45 μm sterile filter. The tubes containing different concentration of EO and nisin were inoculated with 20μl of bacterial suspension (107cfu/ml). The inoculated tubes were incubated at 35, 25 and 10 °C for up to 43 days and observed for visible growth at 18 time intervals (1, 2, 3 , 4, 5, 6, 7, 8, 13, 16, 19, 22, 25, 28, 31, 34, 37 and 43 days). This study showed that The TTD was significantly affected ($p<0.01$) by the different concentrations of Zataria multiflora Boiss. essential oil, the strong inhibitory action was observed by increasing EO concentration in all temperature in 43 days,whereas synergistic effects of different concentrations of Zataria multiflora Boiss. essential oil and nisin wasn't significant ($p> 0.05$) compare with using the EO alone and nisin wasn't significantly ($p>0.05$) affect on the TTD compare with control conditions.

Keywords: TTD, Listeria monocytogenes, Nisin, Zataria multiflora Boiss.

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EXISTENCE OF LISTERIA SPECIES IN BROILER CARCASSES WITH AN ATTEMPT TO CONTROL LISTERIA MONOCYTOGENES USING TRISODIUM PHOSPHATE

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Listeria monocytogenes was the most common bacterial contaminant on broiler chickens at slaughterhouses. Controlling of *L. monocytogenes* on chicken meat has been identified as a specific targeted research need that will assist the industry in solving unique technical challenges within poultry facilities. Trisodium Phosphate (TSP) has been evaluated for its efficacy against pathogens attached to chicken carcasses. Therefore, the prevalence of *L. monocytogenes* and other *Listeria* spp. in ceca, meat and skin of broilers were determined. A further goal was to evaluate the effectiveness of TSP in reduction of *L. monocytogenes* load on chicken meat. A total of 50 broilers were slaughtered upon request from six stores at Ismailia city, Egypt. Additional samples of broiler filets were collected within 20 min post-slaughter. The technique recommended by USDA-FSIS was adopted for isolation and identification of *L. monocytogenes*. The inoculated filets with 0.1 mL of an equal mixture of strains of *L. monocytogens* were divided into four groups. Each group was dipped into TSP solution at concentrations of 0 (control), 5, 10 or C for 0, 3, 7 or 10 min. 92, 42 and 70% of broiler's ceca, meat and 15% at 4 skin were contaminated with *Listeria* spp. respectively. From the *Listeria* spp. positive samples, *L. monocytogenes* were the highest from ceca (60%, 30 of 50 samples), followed by skin (34%, 17 of 50), and meat (16%, 8 of 50). Dipping chicken filets into 0, 5, 10 or 15% TSP solution significantly reduced ($P<0.05$) the counts of *L. monocytogenes* in treated samples as compared to the control. Dipping in 10 or 15% TSP for 10 min were significantly reduced ($P<0.05$) *L. monocytogenes* counts to <100 cfu/g. Dipping in 10% TSP for 10 min appears to be an effective treatment for reducing populations of *L. monocytogenes*.

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VIABLE SPECIFIC MICROORGANISM COUNT DURING STORAGE OF COMMERCIAL YOGHURTS

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Three commercial well-known yoghurt brands have purchased from Ankara/ Turkey. Additionally, with ATCC strains of Lactobacillus bulgaricus and Streptococcus thermophilus, control yoghurt was produced in Atatürk Orman Çiftliği State Dairy Factory. Yoghurts was divided separately to sterile containers and stored at 4±2 °C in refrigerator. Serial dilutions was obtained 1/4 Ringer solution. From the dilutions of 10^{-4} to 10^{-9}, each dilution inoculated to 3 of 10% skim milk. All the tubes incubated for 24 h at 37 °C and evaluated by MPN method. Clotted tubes analyzed with immersion microscope for getting the rods and streptococci images. Tubes marked as positive or negative for those views and evaluated with standard MPN table. Additionally, pHs of yoghurts measured just after inoculations. Analysis continued even passed the expiration date. According to results of four replicated study, the pH was stabile enough in commercial yoghurts even over expiration date. Rods count was 10^5-10^6 while cocci count was 10^8-10^9 MPN/g and not changed dramatically. Control yoghurt's pH decreased significantly after producing and rods (as L. bulgaricus) count was 10^6-10^7 while cocci (as S. thermophilus) count was 10^8-10^9 MPN/g. Authors want to thank Directorate of Atatürk Orman Çiftliği State Dairy Factory for kindly support for producing control yoghurts.

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GROWTH RESPONSE OF SALMONELLA TYPHIMURIUM TO SILVER NANOPARTICLE AT DIFFERENT TEMPERATURES

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Different types of nanomaterials have come up but silver nanoparticles have proved to be most effective against bacteria, viruses and other micro-organisms. The aim of this study was to investigate the behavior of a food borne pathogen, Salmonella typhimurium, in BHI broth containing different concentrations of silver nanoparticles at different temperatures. Different concentrations of nanosilver (12.5, 25, 50, and 100 ppm) were inoculated with bacterial suspension and incubated for 10 days at three different temperatures (35, 20, and 5 ˚C). Bacterial samples were taken every day and the colony count was carried out by standard plate count. In this study a dose dependant inhibitory effect of nanosilver was observed and this effect decreased with increasing the temperature. At 35 ˚C, a bactericidal effect was seen at concentration of 100 ppm by the day 2. At 20 ˚C, bacterial count at 50 ppm was 4 logs lower comparing to the control. The greatest antibacterial effect of nanosilver was seen at 5 ˚C whereas at 100 ppm no bacteria was detected after 10 days and the bacterial count was 5×10^1 cfu/ml in BHI containing 50 ppm nanosilver comparing to 1.5×10^5 cfu/ml in control. The results showed that silver nanoparticle has a strong antibacterial effect and this effect increases with decreasing the temperature or increasing the concentration of nanosilver.

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ANTIFUNGAL EFFECT OF ZATARIA MULTIFLORA BOISS. ESSENTIAL OIL IN A FOOD MODEL SYSTEM

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Fungi are significant spoilage microorganisms of foodstuffs during the storage, rendering them unfit for human consumption by retarding their nutritive value and sometimes by producing mycotoxins. The aim of this study was to evaluate the effect of Zataria multiflora Boiss. essential oil (EO) against growth and aflatoxin formation by Aspergillus flavus ATCC 15546 in Iranian ultra-filtered white cheese in brine. Briefly, the cheese slices were treated with different concentrations of EO on the surface using a sterile swab followed by spore inoculation and incubation for 10 days. The means of two perpendicular diameters of the fungal colony calculated every 24 h, and aflatoxin analysis was performed by RP-HPLC at the day 10. The EO at all concentrations tested, had an inhibitory effect against radial fungal growth. However, no concentration of EO examined completely inhibited the growth of A. flavus on cheese, since at 1000 ppm the inhibition was even 75.4% compared to the control. Furthermore, the EO significantly ($P < 0.05$) suppressed aflatoxin formation by A. flavus in cheese, as aflatoxin accumulation was reduced by 33.7% and 75.4% at 50 and 1000 ppm, respectively. The results suggested the potential application of this EO as a natural antifungal to control the growth of molds in foods such as cheese.

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ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS FROM MENTHA PULEGIUM AND ZATARIA MULTIFLORA BOISS. AGAINST SALMONELLA TYPHIMURIUM

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Salmonella typhimurium is the most important food-borne pathogen causing salmonellosis. Application of natural compound, including essential oils (EO) is an effective method against growth of bacterial pathogens in foods. The aim of this study was to investigate the effect of Zataria multiflora Boiss and Mentha pulegium essential oils on food–borne pathogen Salmonella typhimurium. The antibacterial activity of these EOs was evaluated by assessment of the minimum inhibitory concentration (MIC) using macro-dilution and micro-dilution broth methods according to the NCCLS. The MIC value of Z. multiflora Boiss. EO against Salmonella typhimurium was estimated 0.04 % using both macro and micro-dilution. Furthermore, the MIC value of M. pulegium EO were obtained 0.16 % and 0.32 % using macro and micro-dilution broth, respectively, indicating less inhibitory effect of this EO comparing to Z.multiflora Boiss. EO. In conclusion, results of this study indicate the effectiveness of Z.multiflora and M.pulegium on inhibition of growth of Salmonella typhimurium, suggesting the potential application of these oils as a natural antimicrobial in food systems.

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ANTIMICROBIAL ACTIVITY AND PROPERTIES OF *Enterococcus faecium* STRAINS ISOLATED FROM KEFIR

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Kefir is a refreshing, naturally carbonated fermented milk beverage with a slightly acidic taste, yeasty flavour and creamy consistency. Bacteria of the genus Enterococcus are ubiquitous Gram-positive, catalase-negative cocci that often occur in large numbers in vegetables, plant materials, and dairy products. Enterococci have been used in many different applications as starters or adjunct cultures, and in foods they seem to have a major role in improving flavor development and quality of cheese. In this study, the diluted homogenates were plated on M-17 medium and azide agar medium was used aerobically for the isolation of Enterococci. The plates were incubated at 37°C for 2-3 days. The isolates were examined microscopically and checked for Gram reaction and for catalase production using 3% (v/v) H_2O_2 on single colonies. Carbohydrate fermentation tests were carried out using the API kit according to the manufacturer's instruction. Ribotyping was performed with a RiboPrinter Microbial Characterization System and the standard EcoRI DNA preparation kit as described in the manufacturer's operations. Antagonistic activity screening was investigated by two methods agar spot test and well diffusion assay. The amount of produced lactic acid, hydrogen peroxide, proteolytic activity of the lactic acid bacteria was also determined.

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ISOLATION AND CHARACTERIZATION OF AFLATOXIGENIC FUNGI FROM RAISINS VARIETIES IN KHORASANE RAZAVI

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Raisins have been a favorite food since 1490 BC due to their nutritive value and high micronutrients content. Iran is one of the major exporters of raisins in recent years and Iranian raisins are exported to many countries, thus it is important to ensure of microbiological quality and safety of raisins. The aim of this study was to investigate the occurrence and the population of fungi and the characterization of aflatoxigenic fungi from main raisins varieties produced in Khorasan Razavi Province (Mashhad, Quchan, Kashmar, Bardaskan and Khalil abad). The result showed that from 50 raisin samples, 44 samples were contaminated with fungi (%88). The fungi contaminant in Quchan was the lowest, while Kashmar had the highest level of fungi count. In evaluation of contaminated samples in Coconut Agar Medium (CAM) and under ultra violet light (366 nm), it is observed that 29 samples were positive for aflatoxin production (%65.9). The presence of aflatoxin was confirmed by high pressure liquid chromatography (HPLC).

Keywords: Raisin, fungi contamination, Aflatoxigenic moulds, Khorasan Razavi.

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MICROBIOLOGICAL CONTAMINATION OF THE TRADITIONAL CHOCOLATE ICE CREAM SOLD IN THE NORTHWEST REGION OF IRAN

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Ice cream is a dairy product which favors the growth of microorganisms. This is a popular dairy product throughout the world. At this survey, samples (30) of the traditional chocolate ice creams were collected from dairy stores in Tabriz and Khoy cities during June 2009 to October 2009. Samples were examined for total bacterial and coliforms contamination. The means of total bacterial count were 8.77 ± 0.25 log cfu/g and 6.28 ± 0.25 log cfu/g in Tabriz and Khoy respectively. 73.33% of all samples had the coliform contamination more than Iranian standard limit (100/g). This study showed that the overall risk associated with the consumption of the traditional ice-cream is high in the northwest region of Iran. There is need for continuous monitoring of this nutritious product by educating producers, distributers and retailers on good sanitary practices during processing and sale of the product and the possible danger of contaminated product.

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DETOXIFICATION METHODS OF MYCOTOXIN IN FOOD

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Mycotoxins are secondary metabolites produced in a result of fungal growth. Mycotoxin in food produced by fungus is mainly *Aspergillus*, *Fusarium*, *Penicillium* species. The most common mycotoxins are aflatoxins, ochratoxin A, cyclopiazonic acid, citrinin, patulin, trichothecenes, fumonisins, zearelenone. Mycotoxins have mutagenic, cancerogenic, teratogenic, hallucinogenic, estrogenic effect and also they have hepotoxic, dermatoxic, nefrotoxic immunotoxic effects. Consequently mycotoxins must be under specified levels or absent in food. First of all, food must be protected fungus contamination and/or contaminated fungus must be inactivated to prevent mycotoxin produced. However, mycotoxins can be produced in spite of all precaution. Various methods were developed for mycotoxin detoxification. These are seperation of the contaminated parts of the product, extraction of mycotoxin and mycotoxin inactivation by physical, chemical and biological methods. Mycotoxins have heat resistance so that heat treatment isn't successful enough. In chemical applications, generally chlorine agents, ozone and etc. are used according as mycotoxin species. Moreover, raw food process can provide decreasing mycotoxin to desired level. For instant, their level can decrease in fermented food as beer, wine etc. It is determined in biological methods that some bacteria can detoxificate mycotoxins and one of the most important bacteria is *Flavobacterium aurantiacum*.

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THE IMPORTANCE OF MICROORGANISMS AT THE RIPENING OF FOODS

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The quality of raw and auxiliary materials, environment conditions (pH, temperature, etc.) and biochemical reactions actualize during the ripening play a great role at the formation of intended aroma, color and texture of foods. Beside forming distinctive aroma, color and texture, the ripening at the meat products (the sauce of fish, marine fish, fermented sausages, etc), milk products (yogurt, cheese, etc.), floury products technologies (beard, etc.) and the other products (olive, wine, some tea, etc.), inhibit to pathogen microorganisms and facient of spoilage microorganisms. So, safe and good quality foods have been obtained. The microorganisms belong to the kind of bacterium, yeast and mold such as *Lactobacillus*, *Micrococcus*, *Pediococcus*, *Streptecoccus*, *Halobacterium*, *Debaryomyces*, *Saccharomyces*, *Candida*, *Aspergillus*, *Rhizopus*, *Mucor*, *Penicillium* etc. play a role the ripening of foods. These microorganisms generally form aroma compounds at the result of lipolysis, proteolysis, lactose, lactate, citrate, amino acid and free fat acid metabolisms.

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THE EFFECTS OF FOOD PROCESS METHODS ON MICROBIOLOGICAL QUALITY

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Food processing methods are important in terms of food shelf life, quality and food safety. Most of the food processing methods are used either new food production or protecting present form of it. One of the food processing method's aims is healty and safe final product for consumer while microbiological quality of food is under control. In food industry, additional protective chemical, cold/freeze protection, decreasing water activity, under controlled and modified atmosphere storage, heat processing, fermentation, irradiation and high pressure processing is commonly used. Food processing methods have effects of microbiological quality in different compositioned foods. These effects can stop growing of mainly pathogens and some microorganism species which are spoiled food or cause infective in human. Also they can inactivate them completely. In this article, it is aimed to determine microbiological quality changes in the result of using different food processing methods in various foods

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PHAGE RESISTANCE PROFILES OF STREPTOCOCCUS THERMOPHILUS AND LACTOBACILLUS DELBRUECKII SSP. BULGARICUS ISOLATES FROM TRADITIONAL TURKISH YOGURTS

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Yogurt is a fermented dairy product whose popularity has been increasing all over the world. In yogurt production, a mix culture of Streptococcus thermophilus and Lactobacillus delbrueckii ssp. bulgaricus is used as starter culture, which is one of the most important factors determining the quality of the final product. On the other hand, phages create the major problem in dairy plants by slowing the fermentation or even stopping it. The objective of this study is to determine the phage resistances of selected S. thermophilus (26) and L. bulgaricus (25) isolates from traditional Turkish yogurts. Phage resistances were monitored using spot test with high titre phages ($\geq 10^7$ pfu/ml). 26 traditional and 4 commercial S. thermophilus isolates and 25 traditional and 4 commercial L. bulgaricus isolates were challenged with 28 S. thermophilus phages and 15 L. bulgaricus phages, respectively. Most of S. thermophilus isolates were found to be resistant to the phages. Contrarily, L. bulgaricus isolates including commercial isolates were sensitive to the phages except two isolates. The results demonstrate that non-commercial S. thermophilus isolates are generally resistant to the phages while non-commercial L. bulgaricus isolates are sensitive. However, traditional yogurts may still be a source of promising phage resistant L. bulgaricus.

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COMPARISON OF MICRO AND NANOPARTICLES FOR THE RAPID DETECTION OF ESCHERICHIA COLI BY IMMUNOMAGNETIC SEPARATION, AMPEROMETRY, AND SERS

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Detecting and enumerating fecal coliforms, especially *Escherichia coli (E. coli),* as indicators of fecal contamination, are essential for the quality control of supplied and recreational waters. In this study, two rapid methods were developed using micro- and nanoparticles to detect *E. coli*. Both methods are very similar, and rely on the same principles: separation and concentration by means of immunomagnetic particles (micro and nano) coated with antibodies against *E. coli* (immunomagnetic separation), followed by confirmation of *E. coli*. However, there are minor differences in the methods. In the first method in which microbeads are used, the amperometric detection method for *E. coli* ß-galactosidase is used. The microbeads with the captured *E. coli* are incubated in Luria Bertani (LB) broth, with the added inducer isopropyl ß-D-thiogalactopyranoside (IPTG). The induced ß-galactosidase converts p-aminophenyl ß-D-galactopyranoside (PAPG) into p-aminophenol (PAP), which is measured by amperometry using a gold rotating disc electrode. In the second method, the *E. coli* was captured by nanoparticles and the calibration curve was obtained in surface-enhanced Raman scattering. In a comparison with both methods, the amperometric detection enabled determination of 20 cfu/ml *E. coli* within 6–7 h, whereas nanoparticles were able to detect as low as 8 cfu/ml *E. coli* in less than 70 min. Both methods are rapid and sensitive to the target organisms.

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STUDY ON ANTIBACTERIAL EFFECTS OF ARTEMIA URMIANA CYST SHELL CHITOSAN ON LISTERIA MONOCYTOGENES, STAPHYLOCOCCUS AUREUS, SALMONELLA TYPHIMURIUM AND ESCHERICHIA COLI

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Chitosan is a natural antimicrobial which is derived from non-toxic animal resources. This study investigated and compared the antimicrobial characteristics of chitosan which was extracted from shell of Artemia cyst in the lake of Urmia with the same commercial chitosan feature to that of crab shell from A.P.T firm in Vietnam. The experiment was carried by means of two fulded method to find the minimum inhibitory concentration (MIC) of commercial chitosan and Artemia chitosan in (4, 2, 1, 0/5, 0/25, 0/125, 0/062) mg/ml concentration of Artemia chitosan and (6/4, 3/2, 1/6, 0/8, 0/4, 0/2, 0/1) mg/ml concentration of commercial chitosanas on Staphylococcus aureus, Escherichia coli, Salmonella typhimurium and Listeria monocytogenes. MIC of Artemia chitosan for those bacteria and MIC of commercial chitosan were determined 500 ppm and 800 ppm. In the next phase, each of those four bacteria was separately exposed to MIC Artemia chitosan and during 8h of incubation at 37 ^{o}C were artificially cultivated every 2h and colonies appearing on the plates after 24h of incubation were counted and the death time graph of the bacteria was drown to study their destruction process in the presence of MIC of Artemia chitosan. Experimental achievements showed that in this period of destruction speed in Staphylococcus aureus were more than others and the destruction speed of Salmonella typhimurium was the least. Also studying the achieved pictures by electronic microscope from gram-positive Staphylococcus aureus and gram-negative Escherichia coli which were exposed to MIC of Artemia chitosan (500 ppm) depicted that the speed of influence by Artemia chitosan on gram-positive bacteria is much more than gram-negative bacteria. Results of this study depict great abilities of Artemia chitosan in destroying studied bacteria in comparison with those of same commercial one.

Keywords: Artemia chitosan, antibacterial effects, commercial chitosan

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NATURAL OCCURRENCE OF MYCOFLORA, AFLATOXINS AND OCHRATOXIN A IN MAIZE

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A total 96 maize and soil samples were collected from farmers in Cukurova region to determine the occurrence and levels of aflatoxins, OTA and mycoflora in maize and soils. The aflatoxins and Ochratoxin A (OTA) was determined by using CD-ELISA (Direct Competitive-Enzyme Linked Immuno Sorbent Assay), while fungal isolation was done by planting on agar medium. The predominant mycotoxin was aflatoxins with a ranging from 0.9 to 46.7 ppb in 51% on studied samples. Furthermore OTA was detected in 28 (29%) analyzed samples with ranging from 1.4-16.2 ppb. The aflatoxins and OTA co-occurrence was detected in 11 (14%) of contaminated samples. The most frequently isolated fungi were Aspergillus and Fusarium species. The Aspergillus species identified were A. flavus, A. niger and A. terreus. The most frequent isolated species was A. flavus from maize and soil samples.

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THE SURVEY ON THE BACTERIAL CONTAMINATION OF TRADITIONAL ICE CREAM PRODUCED IN GONABAD CITY

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Ice cream, a milk based product is a good media for microbial growth due to high nutrition value, almost neutral PH value and long storage duration. Contamination of this product with pathogen microorganism can lead to food poisoning and food born infection and can endanger the sanitation of human. The aim of this research was to assess microbial status of traditional Ice creams. In this cross-sectional study a total of 100 samples of traditional Ice cream were obtained randomly from the retail stores in summer. All the samples were analyzed for microbial contamination according to the Iran national standard. The collected data were analyzed statistically using t-test by SPSS for windows. Results: The results show that 26% of the samples were contaminated higher than standard level ($>5\times10^4$/g), 75% of the samples were contaminated higher than standard level (>10/g) with Enterobacteriaceae. Staphylococcus aurous and Escherichia coli were isolated from 4% and 32% of samples respectively .No Salmonella was isolated from samples. To prevent out break of poisoning and microbial infections due to consumption of ice cream as well as supervision and control during the production are essential.

Keyword: Traditional ice-cream, bacterial contamination, Gonabad

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DETERMINATION OF CONTAMINATION STAGES AT THE PROCESSING OF FROZEN CHICKEN-DONER KEBAB

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Doner kebab (sometimes known by other names, such as gyro, donair, dona kebab, souvlaki, chawarma or shawirma) is a traditional product generally produced with beef, lamb and/or chicken meat. Chicken Doner Kebab is the most popular product that is consumed in very high amount in Turkey. The aim of this study was to investigate the hygienic conditions and possible contamination sources that limit the shelf-life of the product and cause pathogenic contaminations of "Chicken doner kebab" at the processing stages. Samples from chicken breast-m eat bone, meat after being chopped and from personnel and using devices, kebab sauce, before and after the freezing product totally 13 points of processing were controlled and analyzed. Total viable count, Psychrotrophs, Total lactic acid bacteria, Enterobacteriaceae, Escherichia coli, Total yeast and mould, Salmonella, Staphylococcus aureus counts were determined at all the stages of the processing. Post- contaminations at the last stages were very important for the hygienic production of doner kebab. At the freezing stage lactic acid bacteria, Enterobacteriaceae counts can decreased but one should be very careful about E. coli and S. aureus contaminations. Identification of Critical Control Points (CCPs) in chicken doner kebab production lines lead to less defective and pathogenically safe production, long shelf-life and what's more these managed to increase the market share of this traditional delicious product.

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PCR DETECTION OF CYTK GENE IN FOODBORNE PATHOGENS BELONGING TO CEREUS GROUP

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The aim of work was development of rapid and reliable PCR based method for the detection of cytK gene together with its active promoter using duplex PCR test. Preliminary analysis in silico of cytK genes from available genome sequences of bacteria from cereus group allowed us to design set of three primers enabling for the detection of structural cytK gene and its active promoter. Developed method was applied for testing of 45 bacterial strains isolated from different food products. Obtained results showed that PCR products may be present in three different combinations: i – two DNA bands (238 and 369 bp) characteristic of gene presence and its active promoter, ii – one DNA band (238 bp) for the presence of only gene, iii – no PCR products for the absence of cytK gene. We have found that majority of tested strains (32 of 45) contained active cytK promoter together with structural gene, 12 strains were characterized with the presence of only structural gene without active promoter and 1 strain was deprived of both features. Gene cytK is commonly present in genomes of cereus group, however putative mutations within promoter region may prevent its expression and toxin secretion in 29% of tested strains.

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CHARACTERIZATION OF THE BACTERIOCIN PRODUCED BY LACTOCOCCUS LACTIS SUBSP. LACTIS MA23, ISOLATED FROM BOZA

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The primary aim of this study was to characterization of bacteriocin produced by Lactococcus lactis subsp. lactis MA23, isolated from traditional Turkish fermented cereal beverage called Boza. To determine the antimicrobial activity spectrum of MA23 bacteriocin against Gram- positive and Gram-negative indicator strains, agar spot and well diffusion assays were performed. Further characterization studies were carried out at different temperatures, enzyme treatments and pH to test sensitivity of bacteriocin. The influence of culture medium components on the production of bacteriocin was investigated using Micrococcus luteus as an indicator organism. MA23 bacteriocin was found to be active against wide range of Gram-positive bacteria including Staphylococcus, Lactobacillus, Pediococcus, Bacillus and Clostridium species. MA23 bacteriocin was also inhibited nisin, lacticin and lactococcin producer strains of lactococci. The antibacterial activity appeared to be pronounced between late logarithmic phase and early stationary phase. The bacteriocins were found to be heat and pH stable, but completely sensitive against α-chymotripsin and proteinase K. Supplementation with sucrose and yeast extract enhanced the production of bacteriocin at pH 6.5. In conclusion, MA23 bacteriocin is a new lactococcal bacteriocin which has strong potential for food preservation.

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PCR DETECTION OF PETROBACTIN PRODUCTION ABILITY IN FOODBORNE PATHOGENS BELONGING TO CEREUS GROUP

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The ability to obtain sufficient iron for proliferation in the iron deficient environment of the vertebrate host is the universal virulence factor of pathogenic microorganisms. Production of iron acquisition cofactors called siderophores such as petrobactin is a very important trait for foodborne pathogens from cereus group. The aim of work was the development of PCR based system for the detection of genes responsible for the production of petrobactin – citrate and 2,4-dihydroxybenzoate containing siderophore, recently recognized as important virulence factor of Bacillus anthracis. Analysis *in silico* of petrobactin operons for 9 strains of *B. cereus*, 4 strains of *B. anthracis*, 2 strains of *B. thuringiensis* and 1 of *B. mycoides* allowed us to design set of primers for duplex PCR test for detection of the presence of asbA gene together with its active promoter. Analysis of 45 strains isolated from different food products revealed presence of asbA gene in 36 strains of which 34 possessed active promoter sequence. Obtained results indicate that petrobactin production ability is characteristic not only for *B. anthracis* but is widely distributed in other members of cereus group even in *B. mycoides* recognized as non pathogenic bacterium.

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DETECTION OF MYCOTOXIGENIC FUNGAL ISOLATES IN FLOUR SAMPLES USING DIFFERENT AGAR MEDIA

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Mycotoxins are secondary metabolite of molds. As molds, mycotoxins could be commonly found especially foods and feeds. Mycotoxins have toxigenic properties. One hundred and thirty fungal isolates that were isolated from 26 different cereal origin samples were screened for Aflatoxins and Ochratoxin A production on a Coconut Extract Agar Medium (CAM), 2% Yeast Extract-20% Sucrose (YES) and Czapek Yeast Autolysate (CYA). Aflatoxin and Ochratoxin A producing colonies were detected under long wave UV light (365 nm) by fluorescence on the reverse side after 7 days of growth. Standard strains of Aspergillus ochraceus and Aspergillus parasiticus were used as positive control. Toxin production was detected in thirty-five (26%) isolates of fungal isolates. These mycotoxigenic isolates include that 22 (62.9%) isolates of A.flavus, 4 (11.4%) isolates of A.ochraceus, 4 (11.4%) isolates of A.alliaceus, 4 (11.4%) isolates of A.niger and one (2.9%) isolate of Penicillium verrucosum. As a result, investigated flour samples were included aflatoxigenic and ochratoxigenic fungi. In addition by this method, we were obtained rapid and reliable results about mycotoxin production potential of fungal isolates.

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CONTROL OF FUNGAL DETERIORATION OF SOME TROPICAL FRUITS OF THE FAMILY CUCURBITACEAE

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Crude extracts and essential oils from Allium sativum (Garlic), Allium cepa (Onion), Ocimum gratissimum, Cymbopogon citratus (Lemon grass), plant wastes like sawdust and wood ash were applied on the surfaces of fresh un-bruised fruit samples of Cucumis sativus Linn (Cucumber) and Citrullus lanatus Thunb (Water melon). This was done to determine their potentials, in the control of fungi responsible for the deterioration of these fruits. The result showed the crude extracts from Allium cepa to be most effective against fungal growths on Water melon and Cucumber as these fruits were found to store for 33 and 24 weeks respectively post application of preservative as against the controls that stored for 8 and 13 weeks respectively. Cymbopogon citratus was found to also be a good preservative for cucumber which stored for 29 weeks but was not a good one for Water melon as it stored for only 7 weeks post application. Ocimum gratissimum also was a good control for infecting fungi on cucumber as the shelf life was 18 weeks compared to the 13 weeks showed by the control. Some other preservative materials either extended the fruits' shelf life beyond the shelf life of the control by 1or 2 weeks or the fruits on which they were applied deteriorated earlier than the control. In conclusion, the plant materials will play the important role of preservation to reduce losses incurred by farmers and green grocers. It will also reduce the danger of fungi elaborating mycotoxins on food.

Keywords: Cucurbitaceae, deterioration, fungal, plant materials

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DEVELOPMENT OF AN IMMUNOMAGNETIC SEPARATION AND REAL-TIME POLYMERASE CHAIN REACTION COMBINED METHOD FOR RAPID DETECTION OF ESCHERICHIA COLI O157:H7 IN MEAT AND MEAT PRODUCTS

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Escherichia coli O157:H7 has been known to be a human pathogen for nearly 20 years and has still persisted as a major food poisoning bacterium causing gastroenteritis despite the improvements in food hygiene by legislation and education. Genetic techniques are known to be more specific. Thus, several genetic assays have been described to detect the Shiga toxin genes (Stx). In this case Real-Time PCR technique is using and the aim of this article is to develop method for the rapid detection of E. coli O157:H7 in food which have sufficient sensitivity and speed to meet the requirements of the food industry and the expectations of regulatory agencies. In summary, the immunomagnetic separation and real-time PCR combined method described in this study is sensitive and accurate method for specific detection and profiling of virulence markers of E. coli O157:H7 in meat and meat products. In addition, the real-time PCR format enables construction of standard curves that can be used for estimating concentration of E. coli O157:H7 in food samples. Moreover, this PCR assay represents an improvement over other real-time PCR assays that have either been developed for detecting only the Shiga toxin-encoding genes or a single gene specific to E. coli O157:H7.

Keywords: E. coli O157:H7, immunomagnetic separation (IMS), real-time PCR, meat and meat products

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OZONE APPLICATIONS IN FRUIT AND VEGETABLE PROCESSING

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Ozone is a strong antimicrobial agent with high reactivity, penetrability and spontaneous decomposition to a non-toxic product. Several researchers have shown that treatment with ozone appears to have a beneficial effect in extending the storage life of fresh non-cut commodities such as broccoli, cucumber, apples, grapes, oranges, pears, raspberries and strawberries by reducing microbial populations and by oxidation of ethylene. The use of ozonated water has been applied to fresh-cut vegetables for sanitation purposes reducing microbial populations and extending the shelf-life of some of these products. However, scarce information is currently available about inactivation of foodborne pathogens such as Shigella sonnei by ozone. Although the antimicrobial capacity of ozone has been widely reported, few studies in quality have been carried out. Ozone has been declared in many countries to have potential use for food processing and declared in the US as GRAS. It has a positive impact on water, decomposing many pesticides and reducing the oxygen demand. In contact with organic matter, ozone creates aldehydes, ketones and carboxylic acids, causing less regulatory concern than chlorine. When compared to chlorine, ozone has a greater effect against certain microorganisms and rapidly decomposes to oxygen, leaving no residues. However, a higher corrosiveness and initial capital cost for generator are the main disadvantages compared to the use of chlorine.

Keywords: Ozone, fruit, vegetable

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DETECTION OF FOOD-BORN PATHOGENIC BACTERIA-S. AUREUS ENTEROTOXINS BY MOLECULAR METHODS

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In recent years, molecular based techniques has become popular to detect food born pathogen bacterias rapidly and reliably. Staphylococcus aureus is one of the most common cause of food poisoning throughout the world. Staphylococcal food poisoning is an intoxication resulting from consumption of foods or beverages contaminated with one or more preformed enterotoxins (SEs) produced by S.aureus. SEs are differentiated in serological types according to their antigenic properties. SEs can be routinely detected by ELISA, immunodiffusion and radio-immunoassay etc. However, there are some limitations depends on necessity of detectable amounts of toxins. Recent analysis of the S.aureus genome resulted in the discovery of number of enterotoxin homologues designated as Staphylococcal enterotoxin-like superantigens (SEIs). So, the serological methods are no longer sufficient enough for identifying types of SEs because of antigenic similarities among SEs and SEIs which may cause cross-reaction in tests. For this reason, PCR and hybridization are used as main molecular techniques. Uniplex, multiplex and realtime PCR having an increasing popularity are mostly preferred DNA-based PCR methods. For detecting the products of real-time PCR, there are some techniques like molecular beacon, nucleic acid dyes, taq-man probes and FRET probes.

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THE ANALYZE OF VARIENT GROWTH CONDITIONS INTERACTIONS OF ANTIFUNGAL EFFECT OF DEBARYOMYCES HANSEII AGAINST PENICILLIUM CHRYSOGENUM

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In this study, it was determined antifungal effect against Penicillium chrysogenum (P. chr2) known as spoilage agent in food of three different non-patojen Debaryomyces hanseii (Dha1, Dha2, Dha3) strains formed toxin. In addition it was analyzed interaction significance levels of various growth conditions (pH, NaCl concentration and temperature) on this antifungal effect. It was used agar well diffusion method to determine the antifungal effect and measured zone diameter. SPSS 9.0 packet programme was used for analysing interaction significant levels of various growth condition on zone diameter. Consequently, all Debaryomyces hanseii strains shown antifungal effect against Penicillium chrysogenum and this effect increased with rising NaCl concentration and pH. Besides, it was found that alone NaCl concentration and both pH and NaCl concentration interaction were important ($p<0.05$) on this antifungal effect, but alone temperature and pH interaction were not important ($p>0.05$). In addition to, all of temperature, pH and NaCl concentration interactions were found important for only Dha2 strain.

Keywords: Debaryomyces hanseii, Penicillium chrysogenum, antifungal effect.

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INHIBITORY EFFECT OF SOUR POMEGRANATE SAUCE ON STAPHYLOCOCCUS AUREUS AND ESCHERICHIA COLI O157:H7

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Pomegranate products' increasing demand causes their utility to extend. Although they are supplied by firms which have large scales, they are also produced by traditional methods that change according to regions, in small scales. Nowadays, there are many studies about pomegranate products, which gain popularity among society. In this study, it is aimed to investigate the inhibitory effect of traditional pomegranate sour sauce and commercial pomegranate sauce on Staphylococcus aureus (ATCC-25923) and Escherichia coli O157:H7 (ATCC-43895). Five different traditional pomegranate sour sauce samples made in different regions in Turkey and two different commercial pomegranate sauce samples were analyzed to determine the minimum inhibitory concentrations (MIC) on these pathogens. All samples were analyzed at original pH value and on neutral pH value (7.0±0.2). Also pH values of all samples were determined. MIC test results showed that traditional pomegranate sour sauce samples were more effective than commercial pomegranate sauce and it was found that inhibitory effect of all samples, on the pathogens are not just depends on acidity and also they have an antimicrobial effect, except one commercial sample. Various chemical disinfectants are discountenanced by consumers because of possible concentration defects. In this view of point, this kind of sauce not only gives flavor to foods but they also have advantage as having natural antimicrobial effect.

Keywords: Pomegranate sauce, MIC, Staphylococcus aureus, Escherichia coli O157:H7

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A SURVEY ON THE PRESENCE OF ENTEROBACTER SAKAZAKII IN SOME FOODS SOLD IN TURKEY

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Enterobacter sakazakii has been ranked as "severe hazard for restricted populations, life threatening or substantial chronic sequelae or long duration" by The International Commission for Microbiological Specification for Foods (ICMSF, 2002). Hence in this research some food samples (5 infant food Formula, 20 cheese and 30 spices) were analysed for the presence of E. sakazakii. The presence of E. sakazakii was detected using the conventional method (growth on violet red bile glucose agar plus yellow pigment production on TSA). In this study, for identification and confirmation of the bacteria isolated from food samples, the Microbial Identification System (MIS) based on fatty acid methyl ester (FAME) composition was also used. From 55 samples 3 isolates were identified as E. sakazakii. Results showed that 0 % of infant food formula, 5 % of cheese and 30 % of spices was positive for E. sakazakii. The high contamination level of E. sakazakii suggests the need for monitoring hygienic conditions in the manufacturing and to assess the prevalence of E. sakazakii in foods.

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DETERMINATION OF ANTIMICROBIAL ACTIVITY AND ISOLATION OF ACTIVE COMPOUND IN MORUS NIGRA

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Morus nigra, known as 'black mulberry' has juicy fruits with extraordinary color and a unique flavor. Mulberry trees's fruit, roots and bark have been used in flok medicine to treat diabetes, hypertension, and anemia and arthritis. In addition black mulberry fruits are used for treating mouth lesions in Turkey. The aim of this study was to determine of antimicrobial activity and isolation of active compounds in Morus nigra. Antimicrobial activities of Morus nigra were tested against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Staphylococcus warneri* Staphylococcus hominis, *Bacillus cereus*, *Shigella flexneri* and *Candida albicans* by using broth dillution method where ampicilin and gentamicin used as a positive control. Methanolic extract of Morus nigra was further fractioned using a preparative silica gel-column chromatography. Chromatographic separations were preformed volumetically and a total 15 fractions were collected. Each fraction was assayed for their antimicrobial activity. The fractions including 8, 9, 10 effectivellly inhibited growth of *S. aureus*. Cyanidine 3- glucoside, Cyanidine 3- rutinoside, Pelargodine 3-glucoside and Rutine were determined with HPLC and LC- MS analysis in these fractions. We concluded that these 4 naturally occuring compounds can be used as an antimicrobial agent.

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A RESPONSE SURFACE AND MICROSTRUCTURAL APPROACH TO FIND OPTIMAL COOKING CONDITION OF PINTO BEAN

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Food legumes, as an important constituent of daily diet, are consuming worldwide specially through the populations of developing countries. With regard to the this fact that cooking is the oldest known method for consuming legumes, response surface methodology was used to determine the optimum cooking conditions which was in high consumer acceptability. Textural measurements and sensory evaluation were carried out in order to clarify the properties of cooked beans. Scanning electron microscopy (SEM) of cooked bean tissues were undertaken to observe changes at the cellular level during cooking. In addition, the effects of time and temperature of cooking and different cooking media (salt solutions) on texture were investigated. Cooking temperature (60–90 °C), cooking time (60–120 min), NaCl concentration (1.82–1.94 %) and $CaCl_2$ concentration (0.06–0.18 %) were the factors investigated. Experiments were designed according to Central Composite Design with these four factors, including central and axial points. A second-order polynomial model was developed using multiple linear regression analysis. An important finding obtained in this study refers to the optimum ion concentration needed to soften the grain in a minimum period of time; this is important from an economic as well as from a practical point of view.

Keywords: Common beans; Cooking; Texture; Sensory evaluation; Response surface methodology

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DETERMINATION OF FATTY ACID PROFILE, MINERAL CONTENT AND NUTRITIONAL VALUE OF PERSIAN WALNUT (JUGLANS REGIA L.)

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In this research, chemical composition of Persian walnut grown in the Iran was investigated. The results showed that dry matter content, oil, protein, carbohydrate and nitrogen amount were 94.75%, 64.9%, 14.92 %, 12.84% and 2.76 %, respectively. In addition, mean of the inputted energy level for studied walnut was 695.14 Kcal. The major fatty acids were linoleic acid (50.15%), followed by oleic acid (25.13%), linolenic acid (12.04%) and palmitic acid (8.81%). The ratios of polyunsaturated/saturated and unsaturated/saturated fatty acids of walnut were found to be 5.06 and 7.12%, respectively. Mineral compositions of the walnut e.g., P, K, Mg, Ca, Fe, Zn, Mn, Cu and Na were (averagely) measured as 365, 296, 94, 68, 3.36, 2.65, 2.11, 1.11 and 0.41 mg/100 g, respectively. The study attempts to contribute to knowledge of the nutritional properties of walnut kernels. The walnuts were found to be rich in protein, oil, unsaturated fatty acids and minerals. These results may be valuable for the evaluation of dietary information.

Keywords: Persian walnut, Proximate composition, Nutritional properties, Energy intake

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THE EFFECTS OF NATURAL ANTIOXIDANTS ON PROLONGING SHELF LIFE OF PISTACHIO PUREE

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Pistachio puree is one of the important Turkish commodity and used as a flavoring in cookery and confectionery and also favoured, because of the deep green colour of their kernels, in the ice cream and pastry industry. It is a rich source of oil (50-60%) and contains linolenic and linoleic fatty acids, essential for human diet and oleic acid. Lipid oxidation is the one of the major factors that causes deterioration during the storage and processing of fats and oils containing foods and it may reduce the flavor and nutritive value of these food products. To overcome this problem, antioxidants are incorporated into fats and oils. The use of synthetic antioxidants in food products is not preferred due to their instability and suspected action as prometers of carcinogenesis. For this reason there is a growing interest in the studies of natural antioxidants. In this study, the effects of natural antioxidants on the prolonging shelf life of the pistachio puree, Rancimat Method for the determining the effect of natural plant extract on the oxidative stability of pictachio puree and other parameters that affect the deterioration of fat containing food products will be presented

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A STUDY ON THE OCCURRENCE OF AFLATOXIN M1 IN RAW MILK PRODUCED IN ARDEBIL PROVINCE OF IRAN

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Moulds occur in a great variety of foods, including the concentrated and roughage destined for animal feeding, and can produce mycotoxins under certain conditions. The ingestion of Aflatoxin B_1 (AFB_1) by dairy cattle leads biotransformation of that substance, which is eliminated via milk as Aflatoxin M_1 (AFM_1), and causes damage to human health. The present study aimed to analyze the presence of AFM_1 in the raw milk samples produced in Ardabil province of Iran. From October 2005 to March 2006, 122 samples of raw milk were collected from collecting centers and dairy plants of Ardabil province in Iran. Incidence rate of AFM_1 contamination raw milk was 89.34%. The overall mean of all samples was 19.20- 990.80 ng/l.AFM_1 levels in 77.5% were higher than European Communities/ Codex Alimentarius recommended limits (50 ng/l), while 20.80% of the samples exceeded the prescribed limits of 500 ng/l. Levels of AFM_1 were higher in January, February and March than in October, November and December, but the differences were not statistically significant ($P > 0.05$). It was therefore concluded that, there was a possible hazard to human health in Ardabil province in Iran given the high frequency and levels of AFM_1 in raw milk samples.

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A STUDY ON THE OCCURRENCE OF AFLATOXIN M1 IN POWDERED MILK DISTRIBUTED IN TEHRAN, IRAN

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Aflatoxins are toxic metabolites produced by certain fungi in/on foods and feeds. They are probably the best known and most intensively researched mycotoxins in the world. In this study the presence of Aflatoxin M1 (AFM) in commercial milk powders distributed in Tehran was investigated using ELISA method. Forty two samples were collected in three seasons of spring, summer, and autumn and then were analyzed. Results indicated that 100% of milk powder samples were contaminated with AFM1. Aflatoxin M1 concentration in 14 samples was greater than standard limit set by FAO/WHO that is 0.05ppb. No significant differences were observed in AFM1 level of the samples related to different seasons. However, there were significant differences considering the products of different plants. Contamination rate of milk powder samples respect to 2 different factors was 0.003 to 0.091 ppb. It was therefore concluded that, high occurrence of AFM1 in milk powder samples were considered to be possible hazards for human health.

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CHANGES IN PHENYLALANINE AMMONIA LYASE ACTIVITY OF WHEAT SEEDLING DURING STORAGE AT DIFFERENT TEMPERATURES

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Phenyl keton uria (PKU) is an autosomal recessive genetic disorder affecting on average incidence of about 1 case in 10,000 Caucasian live births. It is caused by deficiency of the hepatic enzyme phenylalanine hydroxylase (PAH; EC 1.14.16.1). Several methods of treating PKU are being investigated, including somatic gene therapy and oral enzyme therapy. Phenylalanine ammonia lyase ((PAL: EC 4.3.1.5) PAL is present in many plants and catalyses the non_oxidative deamination of L. phenylalanine. Oral administration of PAL can reduce blood phenylalanine concentration in PKU patients. Development of efficient methods for preparation of pure PAL in sufficient quantities and protecting it against proteases and different environmental factors is essential before its application. The purpose of this research was to study the effect of exposing wheat seedling to different temperatures for different length of time on PAL activity. Wheat seedlings were stored at -18 °C, 4 °C, and 25 °C and at different time intervals, samples were assayed for PAL activity. Results showed a first order kinetic for inactivation of PLA with half life of 30 and 18 days at -18 °C and 4 °C, respectively. Activity of PAL increased while germination occurred at 25 °C up to 8 days. These results can be used to develop appropriate strategies for purification and storing PAL containing materials with retained PAL activities.

Keywords: PKU, phenylalanine ammonia lyase, kinetics, inactivation

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KINETICS OF INACTIVATION OF LYSOZYME STORED AT DIFFERENT TEMPERATURES

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Lysozyme is an enzyme with antimicrobial activity witch is abundantly found in biological sources It's application as a natural antimicrobial agent in foods is being thoroughly investigated. The purpose of this search was to investigate the effect of storage temperature on the lysozyme activity. Hen egg white lysozyme (HEL) was stored at different temperatures (55, 25, 4, -18˚C). Samples were removed at different time intervals and lytic activity against cell wall of Micrococcus lysodecticus was determined. Result showed that lysozyme activity at -18, 4, 25 and 55 ˚C follows a first order kinetics with rate constants was 1.0×10^{-3} h^{-1}, 1.9×10^{-3} h^{-1}, 6.4×10^{-3} h^{-1}, and 110×10^{-3} h^{-1} at -18, 4, 25, and 55 ˚C, respectively. The activation energy for inactivation was calculated to be ~20 Kcal/mole, significantly lower than the activation energies reported for other enzyme inactivation, indicating low sensitivity of lysozyme inactivation to temperature. When added to the milk, no significant change in Lysozyme activity was observed,, indicating protection against inactivation by milk components. The results of this study indicates lyzozyme might lose most of its antimicrobial activity in foods stored at high temperature and can be used in food stored at low temperatures.

Keywords: lysozyme, activity, solubility, kinetics, milk

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EFFECT OF AGAR AND ARABIC GUM ON THE KINETICS OF INACTIVATION OF LYSOZYME STORED AT DIFFERENT TEMPERATURES

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Lysozyme is an enzyme with antimicrobial activity witch is abundantly found in biological sources .It's application as a natural antimicrobial agent in foods is being thoroughly investigated. The purpose of this search was to investigate the effect of hydrocolloids agar and Gum Arabic on the lysozyme activity stored at different temperatures. Solutions of hen egg white lysozyme (HEL) containing 1% agarose or 20% Gum Arabic in phosphate buffer was stored at different temperatures (-18˚, 4˚C, 21˚C and 45˚C). Samples were removed at different time intervals and lytic activity against cell wall of Micrococcus lysodecticus was determined. Result showed that inactivation of lysozyme follows a first order kinetics at all temperatures. Presence of agar and Gum Arabic decreased the initial of activity of lysozyme by 50% and 75%, respectively. However, no significant difference was observed in the first order rate constants at different temperatures in the presence and absence of hydrocolloids. Arrhenius plots the activation energies (Ea) was 38.7 - 42.6 Kcal/mole at 21- 45˚C and 0.34-1.7 Kcal/mole at -18 – 21˚C, indicating changes in the temperature sensitivity of the inactivation when lysozyme is stored at high and low temperatures. The results of this study indicates lysozyme might lose most of its antimicrobial activity in foods stored at high temperature and can be used in food stored at low temperatures and presence of hydrocolloids decreases lysozyme a activity at all temperatures. Under these conditions one might need to use higher concentrations of lysozyme to achieve adequate antimicrobial effect.

Keywords: Activity, inactivation, kinetics, lysozyme, agar, Gum Arabic

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SYNTHESIS OF UNIFORM MOLECULAR IMPRINTED NANOSPHERES FOR SELECTIVE EXTRACTION AND DETERMINATION OF MELAMINE IN DRY MILK SAMPLES

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Melamine is an organic base chemical most commonly found in the form of white crystals rich in nitrogen. Since 2008, melamine in food baby and especially in dry milk products has attracted much attention all over the world because, infants and young children suffered urinary problems due to the contamination of melamine in infant milk powder. Several methods exist for isolating, identifying and determining melamine dry milk samples but, these methods are usually costly and don't have sufficient selectivity and sensitivity. In this work, a novel method is described for the determination of melamine in dry milk samples using molecularly imprinted solid-phase extraction as the sample cleanup technique combined with high performance liquid chromatography with PDA detection. Uniformly sized molecularly imprinted nanospheres were prepared by precipitation polymerization method using methacrylic acid (MAA) as a functional monomer, ethylene glycol dimethacrylate (EGDMA) as a cross-linker agent, melamine as a template molecule and azobisisobutyronitrile (AIBN) as initiator. The effective factors influencing the precipitation polymerization and the particle size have been studied. Molecular recognition properties, binding capability and selectivity of the molecularly imprinted polymers (MIPs) were evaluated and the results revealed the obtained MIPs have high affinity for melamine in aqueous environment.

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COMPREHENSIVE APPROACH TO CHARECTERISE CONDITIONS PRIMARILY AFFECTING PLANT UPTAKE OF DIVERSE PESTICIDES

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Bioavailability of pesticides is considered as a key factor in respect of both environmental protection and proper food safety authentication and risk assessment. Up to now comparative studies on biological uptake of distinctive pesticides under versatile conditions and in diverse soil types have not been performed yet. The objective of this study was to model the plant uptake of pesticides, and revealing influence of soil types on this feature. One of the most important agricultural plants, wheat (Triticum aestivum) was applied as model system in order to acquire information regarding □biologically incorporated□ amounts of the examined pesticides in cases of different soil types by means of "100 grains experiments". Comparison of efficiency of 5 different pesticide extraction models was also implemented to access availability. Application of humic-acid, $CaCl_2$ solutions were found to be the most appropriate procedures. The bioavailability and the extent of plant uptake of 4 pesticides were investigated for 3 different soil types (brownforest, alluvial, sandy soils) by GC-MS. Biologically available amounts of pesticides differed from one another as a condition of the applied extraction model: most quantity of the pesticides was obtained when using methanolic extraction, while humic-acid and Na-acetate-acetic acid buffer proved to be equally efficient.

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EFFECT OF ULTRASOUND AND TEMPERATURE ON TOMATO PEROXIDASE

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The effects of temperature and ultrasound on tomato peroxidase (POD) activity were investigated. Thermal inactivation of tomato POD was performed at temperatures of 63-67 °C for 25 min. Thermal inactivation of tomato POD showed apparent first order kinetics and activation energy was found as 14.9×10^4 J/mol. The effect of ultrasound on tomato POD activity was investigated at 3-15 μm amplitude levels for 20-150 sec. It was observed that as the ultrasonic power increased, inactivation rate increased. 100% POD inactivation was observed at 50 % power for 150 seconds and same reduction was observed at 75 % power for 90 seconds of inactivation. Regeneration of POD activity was investigated for the samples exposed to ultrasound. There was linear increase in the POD activity which was treated with 3 and 5 μm amplitude levels whereas nonlinear increase was observed in the regeneration of POD treated at high amplitude levels. There was no regeneration in the samples which 100 % enzyme inactivation obtained by ultrasound. A significant decrease in vitamin C content of tomato extract was observed as a function of temperature and treatment time, whereas ultrasonic treatment had no significant effect on vitamin C content of tomato extract.

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THE INFLUENCE OF VARIOUS FACTORS ON ACTIVITY AND STABILITY PROTEINASE IN HETEROGENEOUS SYSTEMS

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In the heterogeneous systems not only soluble components, also insoluble components of processing raw materials, influence on certain functional groups of protein and shielding enzyme molecules from substratum attack, made enzyme conformational instability. We have studied to influence of various factors on activity and stability proteolytic enzymes at processing starch-containing raw materials. The researches showed that alkali-soluble proteins are hydrolyzed with the highest speed, in this case water-soluble and alcohol-soluble proteins are difficultly hydrolyzed with neutral proteinase. The initial speed of alkali-soluble proteins hydrolysis faster 10-11 times, in comparison with albumen, 3-4 times faster than alcohol-soluble proteins, 2-2.5 times faster than salt-soluble proteins. Reactions proceeded in the water medium though proteins were in the insoluble condition. Enzymatic hydrolysis of alkali-soluble proteins with neutral proteinase proceeded more intensively, than hydrolysis of albumen with neutral proteinase. We investigated to influence of thermal processing on the process denaturation and proteolysis of proteins at 120-140 ^{0}C. Hydrolysis of the denatured water-soluble proteins increased with neutral proteinase in comparison with hydrolysis of native albumen with neutral proteinase. The thermal processing negatively influence on hydrolyzability alkali-soluble, salt-soluble and alcohol-soluble proteins. The speed of enzymatic hydrolysis the denatured alkali-soluble proteins decreased in comparison with enzymatic hydrolysis of native proteins. In this case, it is shown, that preliminary water-thermal processing of proteinous substrata leads considerable decrease of their hydrolyzability.

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EFFECT OF PLANT DIETARY FIBERS ON LIPID OXIDATION IN MINCED FISH MUSCLE DURING FROZEN STORAGE

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The objective of the study was to determine the effect of grape seed extract (GSE), pomegranate seed extract (PSE) and cranberry extract (CBE) addition to chub mackerel minced muscle on lipid oxidation during frozen storage (3 months). Each extract was added to minced fish muscle at 2% concentration and their effectiveness to control lipid oxidation was compared with untreated samples. Development of lipid oxidation during frozen storage was evaluated by measuring lipid hydroperoxides (PV), thiobarbituric acid reactive substances (TBARS), conjugated diene (CD) and colour values. The formation of LOOH and TBARS was significantly inhibited by GSE, PSE and CBE addition when compared with control. Among the plant extracts tested, CBE showed the highest efficacy in retardation of lipid oxidation as evidenced by the lower PV and TBARS. A significant reduction of L*, a* and b* values was detected during frozen storage. GSE added samples had the highest redness and the lowest lightness and yellowness. However, samples with PSE showed the lowest a* and highest b* values. These results show that GSE and CBE are very effective inhibitors of primary and secondary oxidation products in minced fish muscle and have a potential as natural antioxidants to retard lipid oxidation during frozen storage of fatty fish.

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FROM SCIENCE TO APPLICATIONS: MILK DERIVED BIOACTIVE PEPTIDES

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Many milk proteins possess specific biological properties that make these components potential ingredients of health-promoting foods. Biologically active peptides can be produced from precursor milk proteins in the some ways and these peptides may affect the major body systems- namely, the cardiovascular, digestive, endocrine, immune and nervous systems under in vitro and in vivo conditions. The beneficial health effects may be attributed antimicrobial, antioxidative, antithrombotic, antihypertensive, immunomodulatory and opioid activities, among others. By modulating and improving physiological functions, bioactive peptides may provide new therapeutic applications for the prevention or treatment of chronic diseases. Peptides with different bioactivities have been found in a number of dairy products, such as various cheese varieties and fermented milks. Technologies for industrial- scale production of such peptides have recently been developed. Membrane separation techniques, nanofiltration and ultrafiltration techniques are now employed industrially to produce ingredients which contain specific bioactive peptides based on casein or whey protein hydrolysates and already there are a few products supplemented with peptides with specific bioactivities on international markets. The multifunctional properties of milk peptides appear to offer considerable potential for the development of many similar products in the near future. This review attempts to summarize the recent progress in the scientific research and commercial applications milk protein-derived bioactive peptides.

Keywords: Bioactive peptides, milk proteins, applications.

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DETERMINATION OF REDUCING EFFECT ON TOXIC CONTENT OF BREAD USING SULPHUR COMPOUND AND DIFFERENT BAKING TEMPERATURES

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Aim of present study was to determine effects of different baking temperatures (200, 230 and 250 °C), and sodium metabisulphite doses (0, 25, 50 and 100mg/kg dough) on contents of HMF and acrylamide and sensorial properties of bread. Treatments significantly ($p<0.05$; $p<0.01$) effected L*, a* and b* values of crust, they were 64.5, 5.6 and 23.2 at 200°C baked bread, respectively. The crust color became darker with increasing of baking temperature and lighter with increasing of added sodium metabisulphite doses. Also this interaction was significantly ($p<0.05$; $p<0.01$) evaluated by sensorial panel. HMF and acrylamide content of the crust, determined in HPLC, were significantly ($p<0.01$) increased by temperature and, reduced by doses; but, maltol content was only affected ($p<0.01$) by temperature. None of three compounds didn't determine in the crumbs. The HMF and acrylamide contents were determined 93.7mg/kg and 429.7μg/kg in the crust of bread baked at 200 °C, and 137.3mg/kg and 671.4μg/kg at control bread as average, respectively. In conclusion, adding sodium metabisulphite and/or baking at low temperature in bread making process slow down formation of Maillard reaction; therefore, it provides lower content of toxic compounds in bread. Furthermore, this treatments and SO_2 residues doesn't cause any significant changing in sensorial acceptability of breads.

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KOMBUCHA FERMENTATION ON LACTOSE

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Tea fungus usualy called kombucha has excellent fermentation capability on milk at 42 to 45 °C, which is optimal fermentation temperature for native yoghurt production. Duration of fermentation is related to the required pH value (4.4 - 4.5) and highly valued functional milk-based beverage can be obtained. The basic sugar in it is lactose and fermentation profile is sigmoidal. This investigation of kombucha fermentation on black tea with 4.6% of lactose was carried out under the same fermentation conditions: temperature (42°C), kombucha inoculum concentration (10%, v/v) and final pH value (4.4 - 4.5). The required pH value (4.5) was achieved after 16 hours of fermentation on a substrate containing lactose, which is a little bit longer than 12 and 13 hours of fermentation on milk with fat content of 2.2% and 0.9%, respectively. Total acidity of fermented liquid with lactose was much lower in comparison to kombucha fermentation on both types of milk. Small amount of lactose was transformed to metabolites during kombucha fermentation on lactose, which is also typical for milk fermentation.

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FATTY ACID AND MINERAL COMPOSITIONS OF POPPY SEEDS HAVING DIFFERENT COLORS

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Papaver somniferum L. is an annual herb which is mainly cultivated in Australia, Turkey and India. Poppy seeds are commonly used in baked products. The seeds contain up to 50% oil and generally rich in polyunsaturated fatty acids. The oil extracted from the seed is widely utilized as cooking oil and in the manufacture of some cosmetic product. Poppy seeds have a wide variety of colors; white, brown, gray, blue etc. In this study, major fatty acids and mineral contents of poppy seeds having different colors (blue, brown and white) were investigated. Fatty acid compositions of the poppy seeds were determined by GC/FID and elemental compositions were analyzed by ICP/OES. Major fatty acid components were found to be linoleic (71.25–72.16%), oleic (14.29–16.08%), and palmitic (9.93–10.65%). There were significant differences in linoleic and oleic acid content of poppy seed depending on the color. The major elements in all poppy seeds were aligned from high to low as Ca, P, K, Mg, S and Na. The minor elemental composition of poppy seeds was found as Zn, Mg, Fe, Cu, Li, B, Al and Ba. The color of seeds significantly affected mineral content other than Na, Cu, Li and Al.

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INVESTIGATION ON AROMA COMPOUNDS OF CITRUS HONEY USING SOLID PHASE MICROEXTRACTION AND GAS CHROMATOGRAPHY – MASS SPECTROMETRY

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Determination of aroma compounds of unifloral honey is promising to find a reliable marker for authenticity test. There is a great variability in the aroma compounds of the honey since it comes from different origin. In unifloral honeys, these compounds are directly relates with its botanical and geographical origin. The aim of this work is to investigate the aroma profile of citrus honey, from Antalya – Çakırlar region. Aroma compounds were analyzed by means of SPME-GC/MS analysis, after citrus honey was stored at room temperature for 8 months. Aroma compounds of citrus honey were extracted by using SPME method in different conditions (at 60°C for 30 min and 60 min; at ambient temperature in ultrasonic bath for 5 min). The extracted aroma compounds were eluted through TRB-5MS (30m x 0.25mm x 0.25μm) capillary column. 46 compounds could be identified in the citrus honey. Of these compounds 1-p-Menthen-9-al isomers (34%) and lilac aldehydes (28%) were determined to be predominant as being key components of the citrus honey. Benzeneacetaldehyde (7.3%), nonanal (4.3%), linalool oxides (3.5%), linalool (3%), dill ether (3%), methyl anthranilate (1.8%) and 3,7-dimethyl-1,4,6-trien-3-ol (1.8%) compounds were also detected.

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VARIATION IN SEED PROTEIN CONTENT IN AIN SALAH SORGHUM [SORGHUM BICOLOR (L.) MOENCH] LANDRACES

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Variation a large variability in the protein content of sorghum seeds is reported probably because the crop is grown under diverse agroclimatic conditions. In Algeria, sorghum cultivars have the capacity to grow in hyper arid ecosystem where the maturity mean temperature is close to 50 °C. This work deals to evaluate protein content variation among in Ain Salah (Algeria) sorghum landraces. Seed protein contents were calculated for 18 sorghum accessions based on total nitrogen and a nitrogen-to-protein conversion factor 6.25. Large differences in protein content (ranging from 11% to 17%) were observed in the sample analyzed and high protein content values were recorded for Ain Salah sorghum landraces. The white seeds of sorghum seem to become less rich in protein after long stock period; this was observed in case of seeds stocked for more than 4 years. Also, a variation for a given germplasm between two harvesting years was observed. Results suggest that both genetic and environmental factors affect sorghum grain protein quantity; however quality need to be examined by amino acids analysis.

Keywords: Protein content, seed, sorghum, Ain Salah, landrace

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EFFECTS OF SOURDOUGH FERMENTATION ON CEREAL STARCH AND PROTEINS

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Sourdough is a mixture of flour and water fermented by lactic acid bacteria (LAB) and yeasts. During sourdough fermentation, hydrolytic activities of cereal and microbial enzymes causes starch hydrolysis, protein and peptide degradation affecting the quality of cereal products. Biological acid production retards bread staling by interfering starch retrogradation. In addition, sourdough reduces starch digestibility, thus the cereal products which have low glycemic index value could be produced. Microbial acidification, degradation of disulfide bonds in gluten protein by heterofermentative LAB and proteolytic activity of cereal proteases during sourdough fermentation increase the solubility of proteins and lead to partial hydrolysis of proteins, therefore an improvement in flavor can be achieved. The LAB enzymes induced degradation of some gliadin fragments which are toxic for celiac patients has been shown and controlled limited proteolysis in wheat and rye doughs to provide cereal products having gluten levels tolerable by celiac patients has been proposed. The negative effects due to hydrolysis and depolymerization of gluten during sourdough fermentation, especially degradation of high-molecular-weight (HMW) subunits of glutenin, and positive effects attributed to the depolymerization and solubilization of glutenin-macropolymer (GMP) have also been reported on the overall quality of bread. The increased knowledge on hydrolytic events during sourdough fermentation is likely provide data for the optimization of fermentation processes at a specific targets such as tolerable cereal products for celiac patients. This review aims to provide detailed information on the effects of sourdough fermentation on the cereal starch and proteins.

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THERMO-OXIDATIVE STABILITY OF SOYBEAN OIL IN THE PRESENCE OF ALPHA-, BETA-, GAMMA- AND DELTA-TOCOPHEROLS

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The study was conducted to evaluate thermo-oxidative stability of soybean oil in the presence of alfa-, beta-, gamma- and delta-tocopherols at different concentrations and isotermal temperatures by differential scanning calorimetry. Oil sample transferred to an aluminum sample pan was heated under nitrogen gas to an isothermal temperature, and scanned up to 60 min under oxygen gas (20 mL/min). Oxidative induction time (OIT) for each concentration (100, 200, 400 and 800 mg/kg) and isothermal temperature (130, 150, 165 and 180 °C) was determined from the normalized thermogram. Increasing the concentration of tocopherols increased the OITs, i.e. 9.82, 14.50, 18.99 and 22.2 min for alfa-; 6.84, 13.58, 21.46 and 31.46 min for beta-; 10.59, 21.93, 32.34 and 40.31 min for gamma- and 4.76, 12.41, 20.99 and 33.75 min for delta-tocopherol at the concentrations of 100, 200, 400 and 800 mg/kg at 135 °C respectively. At the same temperature, the OIT of the control sample was 0.37 min. The reverse was true for the increasing temperature: the higher the isothermal temperature the lower was the OIT. At 180 °C, the OIT decreased below 1 min for all tocopherols. The results show that all tocopherol isomers are the low-temperature antioxidants, and among them, gamma-tocopherol is the highest antioxidant capacity to prevent lipid oxidation.

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TOTAL PHENOLICS AND ANTIOXIDANT ACTIVITIES OF SOME APRICOT VARIETIES

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The aim of this study was to determine total phenolics and antioxidant activities of apricots from Malatya region as well as different genotypes adapted to this region. The amount of total phenolics was determined spectrophotometrically according to the Folin&Ciocalteu procedure and the results were expressed as mg gallic acid equivalents (GAEs)/g of lyophilized apricot (LA). The antioxidant activity was determined by the DPPH and ABTS methods. The results of both ABTS and DPPH tests were expressed as μg trolox equivalent/g of LA. Among the apricot varieties evaluated, Star early orange (adapted from USA) has the highest total phenolics (8191.6 mg GAEs/ kg of LA) while, the lowest total phenolics was determined in Sam (adapted from Aegean region) variety (3230.8 mg GAEs /kg of LA). Similar antioxidant activities were observed with two assays for the same apricot varieties. According to antioxidant activity results, the highest and the lowest activities were found in Star early orange and Sam varieties as 2516.87 and 864.26 μg trolox equivalent/g of LA for DPPH method and 2731.9 and 748.5 μg trolox equivalent/g of LA for ABTS method, respectively. A good correlation was found between the total phenolics and antioxidant activities.

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EFFECT OF ULTRASOUND ON LIPASE-CATALYZED ACIDOLYSIS OF LAURIC ACID WITH TRIOLEIN

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Lipase catalyzed reactions are widely used in lipid modification. To determine the effect of ultrasound on incorporation ability of lipases in acidolysis of lauric acid with triolein, tightly closed screw-capped glass vials, containing equimolar mixture of the substrates and enzyme, was incubated in an ultrasound water bath operated at 35 kHz frequency (temperature, 50 °C; reaction time, 6 h; and enzyme dosage, 10%). Three immobilized lipases, namely, Lipozyme TL IM, Lipozyme RM IM, and Novozym 435, was used as the biocatalysts in acidolysis performed in hexane. In another two set of experiments, the vials were also incubated in a water bath with (200 rpm) and without shaking. Thus, usability of ultrasound instead of shaking was assessed by comparing the amount of lauric acid incorporated in ultrasound application with those of others. Our results showed that the ultrasound enhanced incorporation abilities of the lipases except Lipozyme TL IM. The amount of lauric acid incorporated into triolein was 17.35, 17.75 and 21.78% with no shaking, shaking and ultrasound treatments, respectively, for Lipozyme RM IM catalyzed acidolysis. Similar advantageous was also obtained with Novozym 435. In conclusion, ultrasound can be used alternatively in lipase catalyzed acidolysis for obtaining better incorporation rates

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EVALUATING THE PHYSICOCHEMICAL COMPOSITION OF THE OIL FROM PISTACIA KHINJUK FRUITS AS A NEW SOURCE OF EDIBLE OILS

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This study was accomplished to investigate the chemical composition of the Pistacia khinjuk oil grown in Iran, and compare their properties with those of the kernel oil from P. vera L. cv. Ohadi (PVO)and olive oil . Pistacia khinjuk (PKH) and olive oils showed significantly lower unsaturated to saturated fatty acid ratios (3.77, 4.61,respectively) and calculated oxidizability (Cox) values (2.64, 2.75, respectively) than those of the P. vera L.cv.Ohadi (PVO) kernel oil (8.91, 4.41). Iodine values, saponification number, dynamic viscosity (Cp) and density (g/cm3) of PKH, PVO and olive oils were 84.47, 110.66 and 84.12, 79.46, 118.79 and 177.79, 12.36, 9.44 and 10.45 and 0.86, 0.85 and 0.91, respectively. The unsaponifiable contents, which were composed mainly of sterols, ranged from 1.6 to 6.14%. Total tocopherols and total phenolics contents differed significantly, the greatest concentration was for the PKH oil (981 and 120.64 mg/kg), followed by the PVO (815.90 and 62.84 mg/kg) and olive (356.59 and 15.65 mg/kg) oils. The chemical composition data indicated the PKH oil is probably the most resistant to lipid oxidation, followed by the olive and PVO oils but from the viewpoint of nutritional value, PVO oil was the best oil that followed by the PKH and olive oils.

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THE EFFECTS OF RESISTANT STARCHES ON THE QUALITY ATTRIBUTES OF DEEP-FRIED BREADED FISH FILLETS

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Deep-frying of breaded fillets is popular due to its well-liked flavor and aroma. However, deep-frying will always result in high fat uptake by the batter which is undesirable since it is linked to negative health effect and a concomitant loss of the PUFA. Therefore, a study was conducted as an attempt to reduce the fat uptake in the breading material. Evaluations such as the lipid content in the batter and the fillets, the moisture loss, the hardness and the color attributes were among those carried out. The starch content of the batter was substituted at 10 and 20% with resistant starches (RS2 and RS4) as the treatments. The addition of the resistant starches significantly ($P<0.05$) decreased the fat content by approximately 1.0 to 4.5 % in the breading material. Their presence also resulted in a significant increase in hardness and fracturability of the breading material. The SEM micrographs of the cross-section of the breading materials showed that batters with RS had less void spaces and were more compact, thus explaining the harder texture observed. Color of breading material was not significantly affected by the substitutions. Either one of the RS can be used as an ingredient in the batter at 10% to reduce the oil uptake without any detrimental quality changes to the product.

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ESSENTIAL OIL COMPOSITION OF LEMON PEEL OIL EXTRACTED BY HYDRODISTILLATION

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Lemon (Citrus lemon (L.) essential oil is used in many products such as foods, beverages, cosmetics and medicines. It has germicidal, antioxidant and anticarcinogenic effect. Lemon essential oils are a mixture of volatile compounds and consist mainly of monoterpene hydrocarbons. In this study, essential oil composition of lemon was determined. Lemon peels (cultivar Kutdiken) were shredded after harvest and its essential oil was hydro distillated by using Clevenger apparatus. The composition of the obtained essential oil was investigated by gas chromatographic method by using GC/MS. The yield of essential oil was determined as 3.83 mL/100g peel. 44 components were identified. Identification of individual components was confirmed by computer matching with mass spectral library FFNSC and comparison by retention indices with literature data. Results showed that limonene (64.67%),γ-terpinene (11.91%) and β-pinene (7.74%) are the main components. The other monoterpenes of the essential oil are α-thujene, α-pinene, camphene, sabinene, myrecene, α-phenallandrene, α-terpinene, paracymene, ocimene and terpineolene. There are also oxygenated monoterpenes, sesquiterpenes, oxygenated sesquiterpenes and other oxygenated compounds.

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DETERMINATION OF CHEMICAL CHARACTERISTICS OF SAFFRON IN DIFFERENT AREA OF IRAN

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Iran with production to be written again more than %74 of global production of saffron (crocus satirical). Production 250 ton per year in 2007 showed that Iran is greatest producer saffron in the world. Chemical characteristics of saffron (Crocus sativus L.) were determined by spectrophotometry device, using 257, 330 and 442 nm. Commercial saffron were obtained from different area of Khorasan state of Iran contain 11 region (Tabas; Ttorbat heydariyeh; Ghaen; Ferdos; Birjand; Gonabad; Bardaskan; Sheshtamad; Khor; Bijvard; Kashmar; Bajestan). 20 ml of this sample taken and dilution make by compressive syringe and membrane (0/45 micron). This sample was taken for spectrophotometery analyzer. Saffron sample collected from 11 region of Khorasan provinces were investigated for chemical characteristics (color, flavor and aroma). Chemical characteristics of saffron were determined by spectrophotometry device. Using 257, 330 and 442 nm for maximum absorption of picrocrocin (creation factor of flavor), safranal (color) and croicn (aroma) respectively. Spectrophotometric analysis showed that maximum absorption for pricrocrocin and safranal were 1/928 and 2/760 respectively for Torbate Heydariyeh county, and maximum absorption for crocin was 1/008 for she shamed of Sabzevar county.

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EFFECTS OF GAMMA IRRADIATION AND FROZEN STORAGE ON MICROBIAL LOAD AND PHYSICO-CHEMICAL QUALITY OF TURKEY MEAT

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Irradiation is the most effective technology in eliminating pathogens of microorganisms in meat and meat-based products to improve their safety and shelf life. The aim of this study was to evaluate the effects of gamma irradiation and frozen storage as a combination process for improvement of turkey breast shelf life. Turkey meat samples were γ irradiated at doses of 0, 0.5, 2 and 4 kGy. The samples were stored at at -18 °C and underwent microbial analysis, chemical characteristics and sensory evaluation at 2 months intervals. Mean bacterial loads and coliform counts were $7.1\times10^7\pm2.0\times10^7$ and $1.9\times10^7\pm7.1\times10^6$ (CFU/g) at 0.0 kGy irradiation dose (control), respectively. In this study, irradiation and frozen storage were more effective than either treatment alone at decreasing total and coliform counts. However, 4 kGy dose reduced the counts of mesophilic bacteria and coliform by more than 5 log units, while Salmonella was not detected. Microbial analysis indicated that irradiation and freezing storage had a significant effect ($P < 0.05$) on the reduction of microbial loads. Irradiation of samples significantly increased their amounts of thiobarbituric acid reactive substances (TBARS) but had no significant effects on their total volatile nitrogen (TVN) contents, while storage significantly increased the TBARS and TVN for irradiated and nonirradiated samples. Gamma irradiation showed no significant effects on the sensory properties of turkey meat.

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DETERMINATION OF PHENOLIC COMPOUNDS FROM MACELA (ACHYROCLINE SATUREIOIDES)

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The presence of phenolic compounds in medicinal plants is responsible for the antioxidant and anti-inflammatory activities of these species, allowing them to be used as potential chemopreventives. The main objectives of this work were: (i) identify the phenolic compounds yield in the extracts of macela (*Achyrocline satureioides*) obtained using supercritical carbon dioxide, hydro distillation, and low pressure solvent extraction; (ii) determine the antioxidant activity of the extract. The material was comminuted in a knife mill and the particle size distribution of the solid was determined using an agitator containing sieves of the Tyler series meshes 24 and 48, for the turmeric and rosemary. The highest extract yield for all the tested plants was obtained by LPSE followed by SFE and HD. The TLC analysis of the ethanol LPSE extract showed the presence of several undesired compounds. The extracts of macela flowers obtained by supercritical fluid extraction presented higher yields in phenolic compounds if compared with the ones obtained by LPSE. The phytochemical profile was a function of the extraction methodology (SFE, LPSE, and HD). The largest antioxidant activities of macela were observed for the SFE extract.

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COMPARE OF PHENOLIC COMPOUNDS VALUE FROM TURMERIC AND ROSEMARY

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Phenolic compounds in medicinal plants are responsible for the antioxidant and anti-inflammatory activities of these species, allowing them to be used as potential chemo preventives. The main objectives of this work were: (i) compare the phenolic compounds yields in the extracts of turmeric (Curcuma longa L.) and rosemary (Rosmarinus officinalis) obtained using supercritical carbon dioxide, hydrodistillation, and low pressure solvent extraction; (ii) determine the antioxidant activity of the extracts. The material was comminuted in a knife mill and the particle size distribution of the solid was determined using an agitator containing sieves of the Tyler series meshes 24 and 48, for the turmeric and rosemary. Result shows that SFE resulted in extracts with high antioxidant activity (80-100 %) for rosemary and turmeric. Even after 3 h the antioxidant activity was kept approximately constant for the SFE extracts. The extracts of rosemary leaves and turmeric roots obtained by supercritical fluid extraction presented higher yields in phenolic compounds if compared with the ones obtained by LPSE. The phytochemical profile was a function of the extraction methodology (SFE, LPSE, and HD). The largest antioxidant activities of turmeric, and rosemary were observed for the SFE extract.

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COMPARE OF EXTRACTION OF PHENOLIC COMPOUNDS FROM PISTACIA ATLANTICA IN DIFFERENT SOLVENTS

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Wild pistachio is a tree in pistachio "Pistachio mutica L." and has various varieties that grow in altitudes and arid and semiarid mountain lands and in many of Iran's provinces such as: Ilam, Kermanshah, Lorestan, Kurdistan, Azerbaijan Gharbi, Azerbaijan Shaghi, Fars, Kerman, Balouchestan and Khorasan. The aim of our study was to ascertain the influence of the solvents on the content of total as well as on some individual phenolic compounds. The mutica wild pistachio (Pistachio mutica L.), one (Khanian, et al., 1995) of the popular forest-product in Ilam province, Iran, was obtained to this work. Phenolic compounds were extracted from Pistachio. Total phenolic content as well contents of seven individual phenolics, such as gallic, chlorogenic, ellagic, sinapic and protocatechuic acid, (+)-catechin and juglone, were detected. As extraction solvent, methanol or ethanol were compared. We can conclude that the efficiency of the phenolics extraction depends on the type of the solvent as well on the phenol, which is being isolated. For total phenolics extraction from green walnut fruits methanol was more efficient compare to ethanol. Similar was for some individual phenols, such as juglone, (+)-catechin, gallic, protocatechuic and chlorogenic acid.

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ANTHOCYANINS AND ANTIOXIDANT CAPACITY OF PRUNUS SPINOSA L. FRUITS FROM BANAT COUNTY, ROMANIA

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In this paper methanolic extracts from fruits of Prunus spinosa L. were analyzed for total anthocyanins, total phenolics and antioxidant activity. Extraction of the anthocyanins with acidified and unacidified methanol in ultrasonic conditions was carried out. Different organic and inorganic acids were used. The extracts have been analysed by high-performance liquid chromatography (HPLC) using a Dionex Ultimate 3000 apparatus equipped with photodiode array detector for characterized the anthocyanins. Anthocyanins content were quantified by the pH differential method using a Jasco V 530 UV-VIS spectrophotometer. Total phenolics have been determinated by Folin-Ciocalteau method. The free radical scavenging activity of the blackthorns extracts was perform by using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay. The reduction of DPPH was followed by a spectrophotometric method and the antioxidant capacities of the extracts evaluated by this assay were correlated with their anthocyanins and total phenolics content. The unacidified methanolic extract shows the higher anthocyanins content and best antioxidant activity.

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PROCESS CONDITIONS FOR THE OPTIMIZATION OF IRANIAN KEFIR GRAIN PRODUCTION FROM WASTE-WHEY BY RESPONSE SURFACE METHODOLOGY

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A response surface methodology was developed to describe the effects of whey lactose concentration, concentration of yeast extract, temperature and pH on kefir grain biomass increase using cheese whey as a fermentation media. Initially, one factor at a time was applied to evaluate the effect of different nitrogen sources. The results showed that the concentration of yeast extract significantly influenced the biomass increase. Then, a 24 full-factorial central composite design (CCD) was used to optimize the process conditions. By using multiple regression analysis, the experimental data were fitted to a second-order polynomial model. RSM analysis indicated good correlation between experimental and predicted values. The most suitable combination of variables for higher biomass increase (68.78%) were 80 g/l, 15.90 g/l, 5.9 and 21 °C for concentration of whey lactose, concentration of yeast extract, pH and temperature, respectively. At these optimal conditions, biomass increase obtained experimentally was found to be 63.48% which was close to prediction model. Scanning Electron Microscopy (SEM) showed significant difference between the interior and exterior of the sample. Long and short, and straight and curved rods and yeasts were seen in all samples. There were no gross differences in structure between samples.

Keywords: Kefir grain; Optimization; Whey; Central composite design; Scanning Electron Microscopy

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CHANGES IN PROPERTIES OF PALM SUGAR SYRUP PRODUCED BY AN OPEN PAN AND A VACUUM EVAPORATOR DURING STORAGE

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The aim of this study was to monitor the properties changes in palm sugar syrup produced by an open pan and a vacuum evaporator at 70 and 80°C during storage under 4°C and room temperature (30°C) for 12 months at one month interval. During storage, Maillard reaction took place in samples stored under 4°C lower than those stored under 30°C as evidenced by lower a* value, browning index (BI) and hydroxymethylfurfural (HMF) and higher L* value, fructose, glucose and free amino group content during 12 months of storage. HMF, a possible mutagen formed by non-enzymatic browning during heating and storage of sugar based product. Only sample produced by an open pan and stored under 30°C presented the HMF content (50.58 mg/kg) higher than the permitted maximum limit (40 mg/kg) as recommend by the Codex Alimentarious while other samples still contained HMF in agreement with this standard. In addition, microbiological quality and total soluble solid of all samples complied with Thai legislation standards for palm sugar syrup during storage at both temperatures.

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CONSTRUCTION AND UTILISATION OF A MINIATURISED, PORTABLE BIOSENSORIC DEVICE CAPABLE OF MULTICOMPONENTAL FOOD ANALYSIS

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Unisensor is an enzyme-based portable amperometric biosensor equipped with exchangeable enzyme cell for the determination of diverse constituents of food samples. A multifunctional sensoric device was developed and was utilized as a quick and simple tool for analytical investigations. Four enzyme-cells have been compared operating with glucose-oxidase (EC 1.1.3.4), tyrosinase (EC 1.14.18.1), diamine-oxidase (EC 1.4.3.6) and ascorbate-oxidase (EC 1.10.3.3) enzymes. The enzymes were bound to a natural protein membrane or in a column reactor where the enzymatic reaction took place. The apparatus was applied for the analysis of food contaminants (e.g. biogenic amines, pesticides) and for the estimation of factors positively influencing the biological systems (antioxidant capacity, poliphenols, vitamin C) being functional food ingredients. In the optimization studies of the different biosensors the effect of temperature, pH, ionic strength of the buffer, flow rate was investigated. A tyrosinase biosensor was constructed to determine the polyphenol content and the enzyme was immobilised on glass beds by glutaraldehyde cross-linking method and filled into a column. Using the newly developed biosensors the glucose, ascorbate and polyphenol content have been determined in different fruit juices while biogenic amin and polyphenol content in wine samples.

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FUNCTIONALITIES AND ANTIOXIDATIVE PROPERTIES OF PROTEIN HYDROLYSATES FROM THE MUSCLE OF ORNATE THREADFIN BREAM TREATED WITH PEPSIN FROM SKIPJACK TUNA

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Functional properties and antioxidative activities of protein hydrolysates prepared from ornate threadfin bream (Nemipterus hexodon) muscle, using skipjack tuna pepsin, with different degree of hydrolysis (DH: 10, 20, 30%), were determined. The solubility of hydrolysates varied from 71 to 99% in the pH range of 3-9, depending on their DH. Emulsifying and foaming properties of hydrolysates were governed by DH and concentrations used. Hydrolysates with 20% DH had the highest ABTS and DPPH radical scavenging activities. However, chelating activity on Fe^{2+} of hydrolysate increased as DH increased ($P < 0.05$). Size exclusion chromatography of hydrolysates with 20% DH using Sephadex G-25 revealed that antioxidative peptides with molecular weight of approximately 1.3 kDa exhibited the highest ABTS radical scavenging activity. The fraction containing antioxidative peptides was quite stable over a wide pH range (1-10) and had high stability when heated at 100 °C for up to 3 h. In vitro simulated gastrointestinal digestion revealed that ABTS radical scavenging activity of the antioxidative peptides was not affected by pepsin hydrolysis, while further digestion by pancreatin enhanced the activity. Therefore, protein hydrolysates produced by skipjack tuna pepsin can be used as a promising source of functional antioxidative peptides.

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FUNCTIONAL AND PHYSICOCHEMICAL PROPERTIES OF STARCHES ISOLATED FROM SORGHUM CULTIVARS CULTIVATED IN ALGERIAN HYPER ARID REGIONS

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The objectives of research area are valorization of the local genetic resources of cereals and develop their crop production for its available added-value, giving grain quality and potential applications of theirs components. We are interested in Sorghum (Sorghum bicolor (L.) Moench) cultivated in Tidikelt and Ahaggar in the Sahara of Algeria, a hyper arid regions bordering the Sahel countries such as Niger and Mali, known to be important sorghum producer countries. Data on Algerian sorghum starch properties were nonexistent so the aims of this study were isolation and partial characterization of local Sorghum bicolor starches for their applications and transformations. Many samples of sorghum grains are collected in 2004-2006 harvests. Some functionality and physicochemical properties of isolated starch as color, size distribution, amylose content, rheological and thermal properties are studied for their competitive potential to satisfy specific technological and nutritional needs for target market. The particularity of these starches properties are lies to the grain growth in hyper arid ecosystem where the maturity temperature is very high reaching a monthly mean of 45.2 °C and their irrigation using saline underground water. Therefore the characterization of the grain and its components is particularly relevant considering their high drought resistance and capacity to grow using low-input agricultural fertilizers which may stimulate local populations to enhance their cultivation and transformation and so contribute to the socioeconomic development of these regions.

Keywords: Sorghum, starch, functional properties, physicochemical properties, Sahara of Algeria.

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PRODUCTION OF CHITOSAN FROM ARTEMIA URMIANA CYST SHELL

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Chitosan with scientific name, poly(β-D(1-4)-2-amino-2-deoxy-α-glucan) was obtained from deacetylated chitin with chemical name poly(β-D(1-4)N-acetly-glucosamine). In food industries this substance is used as spoilage inhibitor and antifungal preservative to expand the shelf life of fresh products. Also, it is used as an antibacterial substance to prevent the growth of a wide range of bacteria. One of the new and important sources of chitosan is Artemia cyst shell that it is underling Crustacean and Artemiede family. Urmia Lake is one of the main source for Artemias which so-called Artemia urmiana. In this study for production of chitosan cyst shell of Artemia urmiana was collected and dried. Chitin in cyst was extracted chemically in four stage, mineral, protein, lipid and color removal and Purified whit NaCL and acetic acid. The yield of extraction was 28±3% (w/w). Production of chitosan from chitin was through reaction of NaOH and ethanol 97% for 4h in boiled temperature. The yield was 60±3% (w/w). In order to identification of the chemical structure and quality control of Artemia chitosan Infrared spectroscopy (FTIR) and C.H.N.O-analyzer was carried on. As a result chitosan contained 5/64% N, 40/27% C And 6/7% H. Finally, noticing suitable quality of Artemia chitosan in comparison with commercial chitosan expresses that this substance can be substituted for commercial chitosan which is imported with high price and used for different consumption.

Keywords: Chitosan, chitin, extraction, Artemia urmiana

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PESTICIDE RESIDUE ANALYSIS IN PARSLEY, LETTUCE AND SPINACH BY LC-MS/MS

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In this study, pesticide residues in parsley, lettuce and spinach sold in Hatay province (Turkey) were analyzed by the application of liquid chromatography-tandem mass spectrometry (LC-MS/MS) after a sample preparation step based on the buffered Quick, Easy, Cheap, Effective, Rugged and Safe (QuEChERS) extraction method. In parsley; carbaryl was detected in 40 samples (100%) in the concentration range of 0.0030-0.0035 mg kg^{-1}, and chlorpropham was detected in 26 samples (60%) in the concentration range of 0.0005-0.005 mg kg^{-1}. In lettuce; acetamiprid was detected in 12 samples (30%) in the concentration range of 0.0001-0.1 mg kg^{-1}, carbaryl was detected in 32 samples (80%) in the concentration range of 0.0030-0.0031 mg kg^{-1} and metalaxyl was detected in 40 samples (100%) in the concentration range of 0.0007-0.008 mg kg^{-1}. In spinach, no pesticide residue was detected for the pesticides with the maximum residue limit (MRL) given. Although parsley and lettuce samples contained some pesticide residues, all these values were below the MRLs established for these compounds. The results showed that despite a high occurrence of pesticide residues in parsley and lettuce samples from Hatay province, the contamination levels of these residues may not be considered as a serious public health problem according to Turkey's pesticide regulations.

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BODY COMPOSITIONS AND FATTY ACID PROFILES OF BROWN TROUT (SALMO TRUTTA MACROSTIGMA) CAUGHT FROM KÖRKÜN BROOK

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The body composition and fatty acid profiles of Brown trout living under natural conditions in Anatolia were analysed. The total crude protein, lipid, crude ash, dry matter and fatty acid composition of fish meat analyses were determined. The rates of crude protein, lipid, crude ash and moisture of *Salmo trutta macrostigma* were found respectively as 19.92%, 3.461%, 1.18% and 75.11%. The predominant fatty acids found in brown trout muscle were myristic acid (C14:0, 2.23), palmitic acid (C16:0; 18.81%), palmitoleic acid (C16:1, 8.82%), stearic acid (C18:0; 4.11%), oleic acid (C18:1 n9; 11.93%), linoleic acid (C18:2n6, 3,72%), linolenic acid (C18:3n3, 9.27%), eicosapentaenoic acid (EPA; C20:5 n3; 7.48%) and docosahexaenoic acid (DHA; C22:6n3; 7.69%). The fatty acid composition analyses showed that wild brown trout consisted of 29.17% saturated (SFA), 21.58% monounsaturated (MUFAs) and 31.21% polyunsaturated acids (PUFAs).

Keywords: Brown trout, body composition, fatty acid profiles

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STUDY ON CHEMICAL COMPOSITION OF PINK SHRIMP IN PERSIAN GULF

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Shrimp meat is an excellent source of nutrients such as protein and mineral in the human diet. Apart from their delicacy, crustacean species such as shrimp consist of protein, amino acids, peptides and other useful nutrients. Pink shrimps have become an economically important species for Persian Gulf in Iran. However, little information has been reported about chemical composition of pink shrimp. The objective of this investigation was to find the chemical composition of pink shrimp in Persian Gulf. Pink shrimp with the size of 65 shrimps/kg, were obtained from the Persian Gulf and then were peeled off. Shrimp meats were analyzed for protein, fat, salt, ash, moisture and TVN content according to the method of AOAC. In this study protein content was %22.97±1.06 and fat, salt, ash and moisture content were %1.62±0.13, %0.35±0.05, %1.86±0.06, and % 74.15±2.59 respectively. However, chemical composition varies in different species. The difference in chemical composition between species might be due to the different characteristics of the shrimp.

Keyword: pink shrimp, Persian Gulf

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IMPACT OF BLEEDING ON LIPID OXIDATION AND QUALITY CHANGES OF SEABASS SLICES DURING ICED STORAGE

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The aim of this study was to investigate the impact of bleeding on lipid oxidation, microbial load and fishy odour develpoment of the seabass (Lates calcarifer) slices during 15 days of iced storage. Bled samples showed the lower peroxide value (PV) and thiobarbituric acid reactive substances (TBARS) throughout the storage ($P<0.05$). Bleeding effectively lowered total haem and non-haem iron contents in seabass slices. The release of non-haem iron was pronounced in un-bled samples during the storage. Solid phase micro extraction-gas chromatography mass spectrometric (SPME-GCMS) analysis revealed that the bled samples stored in ice for 15 days contained the lower amount of volatile compounds. Heptanal, the major volatile compound detected in the un-bled samples, was 4-fold higher than that of bled counterparts. Aldehydic compounds including hexanal, octanal, nonanal and nonenal contents were also higher in the former. Bled samples had the lower fishy odour, compared with the un-bled counterparts during the storage ($P<0.05$). The lower total viable counts (TVC) and psychrophilic bacterial counts (PBC) were observed in bled samples, compared with un-bled counterparts ($P<0.05$). It can be concluded that bleeding was a potential means in retarding lipid oxidation, fishy odour development and microbial growth of seabass slices during storage in ice.

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MICROBIOLOGICAL AND BIOCHEMICAL CHANGES DURING RIPENING OF TURKISH FERMENTED SAUSAGES AS AFFECTED BY PROCESSING TEMPERATURE AND STARTER CULTURES

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The objective of the study was to determine changes in microbiological and biochemical parameters of Turkish fermented sausages produced with different starter cultures and at different temperatures. Three commercial starter cultures of Pediococcus pentosaceus and Staphylococcus xylosus (S1), Lactobacillus sakei and Staphylococcus carnosus (S2) and Staphylococcus xylosus (S3), and one control without starter (C) formulations were developed, and the sausages were ripened at 20-22°C and 24-26°C temperatures. Total mesophilic aerobic bacteria (TMAB), lactic acid bacteria (LAB) and Micrococcus-Staphylococcus bacteria (MSB) counts, sugar, lactic acid, total free fatty acid (FFA) contents were determined during fermentation and drying of sausages. The major changes in the characteristics of sucuk took place during the fermentation stage. This was due to the consumption of carbohydrate sources by LAB and their domination. Sucrose was readily consumed by lactic acid bacteria during fermentation stage in the sausages. High processing temperature resulted in high LAB counts and fast reduction of sugar. Lactid acid production was higher in starter inoculated sausages of S1 and S2. S. xylosus inoculated sausages produced higher FFA and lower lactic acid contents than S1, S2 and control sausages. Two types of starter cultures P. pentosaceus-S. xylosus and L. sakei-S. carnosus were responsible for development of safety characteristics of fermented sausages. The final pH and lactic acid contents were affected by starter culture and processing temperature.

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DETERMINATION OF BIOACTIVE COMPOUNDS IN THE TESTA OF CASHEW NUT (ANACARDIUM OCCIDENTALE L.)

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In the present study, the testa-containing and testa-free kernels of cashew nut (Anacardium occidentale L.) samples were analyzed for certain bioactive compounds and also the major polyphenolic compounds located in the cashew nut testa were identified with HPLC & LC-MS techniques. The testa-containing cashew nut kernels recorded an appreciable level of various bioactive compounds such as β-carotene (21.78 μg/100 g DM), lutein (52.48 μg/100 g DM), zeaxanthin (0.702 μg/100 g DM), α-tocopherol (1009 μg/100 g DM), γ-tocopherol (1.06 mg/100 g DM), stearic acid (7.91 g/100 g DM), oleic acid (33.28 g/100 g DM) and linoleic acid (9.72 g/100 g DM) when compared to testa-free samples. Further, the major polyphenolic compounds present in the testa of cashew nuts were identified as (+)-catechin and (-)-epicatechin with an average weight of 569.9 and 446.4 mg per 100 g DM, respectively. Further, various conventional shelling methods such as oil-bath roasting, steam roasting, drying and open pan roasting were found to reduce significant levels of bioactive compounds, mainly due to high processing temperature (75 - 200 °C). However, the recently developed Flores hand-cracking method was appears to be more effective in retaining higher levels of various bioactive compounds in cashew nut kernels. Presence of remarkable level of such bioactive compounds in the testa of cashew nuts could be of interest for both food and pharmaceutical industries, where it can be employed as an economic source of natural antioxidants with potential health benefits.

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ANTIOXIDANT ACTIVITY OF CERTAIN BIOACTIVE COMPOUNDS EXTRACTED FROM VELVET BEAN: AN UNDER-UTILIZED FOOD LEGUME

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In the present study, the antioxidant activity of certain bioactive compounds was analyzed in raw and differentially processed seed materials of an under-utilized legume, velvet bean [Mucuna pruriens (L.) DC. var. utilis (Wall. ex Wight) Baker ex Burck] collected from South India. The raw seed samples of velvet bean were found to contain appreciable levels of certain bioactive compounds such as total free phenolics (62 ± 0.14 mg/g extract), tannins (38 ± 0.87 mg/g extract), L-Dopa (45 ± 0.17 mg/g extract) and phytic acid (24 ± 0.38 mg/g extract). Analysis of antioxidant activity of bioactive substances indicated that, the phytic acid and tannins possess maximum antioxidant potential under FRAP assay (14.42 and 14.70 μg of extract DM/mM Fe (II)), DPPH radical inhibition activity (206.80 and 206.40 mg DM of the extract/g DPPH) and ß-carotene bleaching method (81.52 and 49.61 % inhibition of degradation of ß-carotene). The total free phenolics, L-Dopa and the positive control (BHT) were found to exhibit low antioxidant activity, when compared to tannins and phytic acid of velvet bean seeds. Among the different common processing methods employed in the present study, sprouting + cooking exhibited remarkable improvement on the antioxidant activity of all the bioactive compounds of velvet bean seeds, which is followed by cooking and pressure-cooking, but open-pan roasting appears to reduce the antioxidant activity. Hence, the sprouting + cooking processing method could be recommended for the versatile utilization of velvet bean seeds as a natural source of antioxidant compounds.

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MODELLING THE KINETICS OF MASS TRANSFER AND COLOR CHANGES DURING OSMOTIC DEHYDRATION OF THERMOSONICALLY PRETREATED SEEDLESS GUAVA

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Effect of simultaneous application of heat and ultrasonic wave (thermosonication) at different levels of intensity on the kinetic of mass transfer and color changes during osmotic dehydration of seedless guava was investigated. Sonication intensity was in the range of 31-64 μs at 85°C. The treated samples were put into sucrose solution (30% w/w) at 33 °C for 180 min osmotic dehydration. Peleg model adequately (R^2= 0.93) described the mass transfer during osmotic dehydration. The application of thermosonication resulted in enhanced rate of mass transfer as indicated by an increase of 16–20% in water loss and 2–4% in sugar gain as compared to the untreated samples. Color was quantified in terms of L, a, and b values in the Hunter system. Thermosonication had significant ($P < 0.05$) effect on the kinetic of color parameters changes, when compared with the untreated samples. The color changes (R^2 = 0.99) during processing including total color difference (R^2=0.98) were described by a zero-order kinetic model. Therefore, the proposed models allow the simulation of kinetics of mass transfer and color changes during osmotic dehydration, and consequently it can be used as a useful tool in the design and control of the corresponding industrial operation.

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YIELD AND QUALITY EFFECTS OF ELECTROPLASMOLYSIS AND MICROWAVE APPLICATIONS ON CARROT JUICE

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Carrot juice holds an important place in vegetable juices with the increased consumption of fruit and vegetable juices. This study focuses on effects of electroplasmolysis and microwave applications in carrot juice processing. Electroplasmolysis provides increased cell wall permeability, electrical conductivity, diffusion and compressibility of plant tissues. On the other hand microwave heating as an alternative method for fruit juice pasteurization has now gained better acceptance as it offers several advantages over the conventional method. In this research; the effects of electroplasmolysis as a pretreatment on yield and quality and the effects of microwave heating on PME inactivation and quality of carrot juice were investigated. Initially, electroplasmolysis and microwave applications were optimized by Response Surface Methodology (RSM). Optimum conditions were found as: 22.2 V/cm oltage gradient and 60 sec. (treatment time) for electroplasmolysis; 90 ml/min-900 Watt for microwave heating application. As a result of electroplasmolysis % 4.24 increases in yield was determined. In addition, % 92.27 PME inactivation was found for microwave heating application. Production of carrot juice was carried out by using optimum conditions for each treatment. Trials were done in four application groups with single electrical treatment and combinations of them. Single treatment application group microwave (MD) and conventional thermal heating (PAS) group. Combination groups were: electroplasmolysis and microwave (EP+MD), electroplasmolysis and conventional thermal heating (EP+PAS). After productions yield in control samples and EP group was determined. In addition PME activity, total pectin, total phenolics, total carotenoid, soluble solid, pH, total acidity, color vaules were determined. The results showed that the highest quality values like total pectin, total phenolic and total carotenoid were determined on combined applications of electrical methods. The results suggested that juice yield and functional properties were increased by EP and electrical heating applications gave better quality characteristics comparing the conventional thermal heating in carrot juice production.

Keywords: Carrot juice, electroplasmolysis, microwave heating, yield, quality.

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OPTIMIZATION OF ANTHOCYANINS EXTRACTION IN BARRBERY BY ULTRASOUND

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Anthocyanins are natural and colourful compounds in fruit and vegetables. In this study, anthocyanins extraction from Barberry (Berberis vulgaris) by ultrasound process at the selected temperatures (30, 40 and 50˚C) and extraction times (10, 20 and 30 minuets) with two solvents (1.5 M HCl–95% ethanol) was done. Then, the concentration of the main anthocyanin in Barberry Cyanidin-3-glycoside was measured through pH differential method. Results showed that the most amount of extracted anthocyanins by Ultrasound extraction are at 50˚C with extraction time 20 minutes. Under these conditions 188.58 mg of antocyanins from 100 ml of extract could be obtained. Natural colour was obtained from Barberry extraction with the brix of 60 and can be used in products, such as sweats, confectionary cream, ice cream and those products which must not further be exposed to high temperatures in their production. The outlook for the use of these colours in food sciences and technology seems promising due to the advances in non-heating processes, the importance of using natural colours in food product, and the positive effects of anthocyanins on health.

Keywords: barberry, anthocyanins, ultrasound method, extraction

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P444

OSMOTIC DEHYDRATION OF CHERRY. PART I: USING GENERAL FACTORIAL DESIGN

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Cherry is extremely perishable fruit and they need to be dried in order to preserve the fruit for later use. In this work, the influences of different osmotic solution concentrations were investigated. Water loss (WL), solid gain (SG) and weight reduction (WR) were investigated during osmotic dehydration of cherry halves using general factorial design with sucrose concentration (40, 55, 70 %, w/v) and immersion time (5 hours) being independent process variables. Quadratic regression equation describing the effects of independent process variables on WL, SG and WR. The results revealed that the soaking time and sucrose concentration all significantly ($p<0.05$) influenced most of the quality indices of osmosed cherry halves. It is suggested that the regression equation obtained in this study can be used to find optimum conditions.

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OSMOTIC DEHYDRATION OF CHERRY. PART II: DRYING OF CHERRY WITH AND WITHOUT OSMOTIC DEHYDRATION AND SOLUTE DIFFUSION COEFFICIENT OF CHERRY

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Freeze drying of cherry is a process commonly used to preserve the product and extend shelf life. However, the cost of freeze- dried product is generally high. The combination of osmotic dehydration and air drying is an alternative new process that could be improves the product quality. This work compares the drying behavior exhibited by in natura and by osmotic dehydrated cherry. The drying was analyzed in terms of effective diffusivity and drying rates. Also, in this work quality parameters of osmo-air-dehydrated cherry (color and vitamin C content of cherry) were examined. Effective diffusion coefficients were estimated using the solution of Fick's second law. Results showed that osmotic dehydration reduces the total processing time in tray dryer and preserve vitamin C contend and color of cherry.

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STABILITY OF BITTER ORANGE JUICE-OLIVE OIL SALAD DRESSINGS STABILIZED WITH POLYSACCHARIDES

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Emulsifying properties of bitter orange (*Citrus aurantium*) juice-olive oil salad dressings stabilized with different polysaccharides were investigated. Oil-in-water emulsions (50:50, v/v) were prepared with bitter orange juice-olive oil in the presence of various concentrations (0.1-1% w/v) of pectin or guar gum or i-carrageenan and then these emulsions were homogenized. Emulsion activity index (EAI) and emulsion stability index (ESI) were determined spectrophotometrically by measuring time-dependent changes in turbidity. Creaming stability of emulsions was followed by visual observation of serum layer with time. Microstructures of emulsions were examined by using polarized light microscopy. The addition of polysaccharides improved emulsion stability and emulsions containing higher amounts of polysaccharide were more stable against creaming. Microscopic observations showed that emulsions containing polysaccharides had small droplets as compared to that of emulsions without polysaccharides and emulsions were flocculated due to the presence of polysaccharides. Larger droplets and creaming were observed when the polysaccharide concentration was not sufficient for coverage.

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INFLUENCE OF MASH PROCESSING ON TOTAL ANTHOCYANIN CONTENT OF RED GRAPE JUICE

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Anthocyanin colour is an important sensory characteristic and often a major quality parameter for fruit juices. Heat treatment is a very important process for transition to grape juice because grape skin contains the maximum concentration of anthocyanins. In this process, optimum heat treatment determined increase diffusion of these compounds. Freshly picked grape samples were crushed and heated 65, 75 and 85 ºC for an hour and after every 15 minutes definite amount of samples were taken and immediately pressed to obtain fruit juice. Pectinase enzyme was added into the fruit juices at a concentration of 50μl/L and heated 50ºC for 45 minutes. Juice samples were clarificated by clarification agents for 2 hours, then filtered and detartarizated. Total anthocyanin pigment content determined by pH differential method of AOAC 2005 with spectrophotometer. Absorbances were measured at 520 nm and 700 nm and results expressed as malvidin-3-glucoside. Results showed that 15 minutes heating wasn't enough to diffusion of anthocyanins for all of heat threatmants. Also after clarification and detartarization processes concentration decreased in all samples. The highest anthocyanin content was determined in the sample of heated at 85 ºC for 60 minutes as 69.27±0.009 mg/L.

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THE CHANGE OF CHEMICAL COMPOUNDS OF ROWANBERRY FRUIT DURING RIPENING

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Rowanberry (*Sorbus aucuparia*) belonging to Rosaceae family is a wild fruit. Harvest of rowanberries is performed before fruits completely ripen. Although rowanberries have a sour taste being at an inconsumable level when they are harvested, they become edible fruits in terms of taste during the ripening periods. In this study, change of chemical composition of rowanberry has been studied during the period in between harvesting and consumption. In unripened rowanberry fruit; water soluble dry material level (Brix), pH value, titration acidity, raw oil, ash-content, raw cellulose, moisture-content, protein-content were determined as 21.5Bx, 4.29, 0.31g/kg, 0.12%, 0.68%, 2.61%, 70.68% and 0.35%, respectively. In the present study pH, titration acidity, and brix were analyzed during ripening. Investigated quantities, except brix, showed decreases during the ripening period at both temperature levels. Brix were found to be 21.5Bx initially and at the end of 20 days-ripening it increased up to 23.40Bx at 22°C and 22.80Bx at 4°C. Titration acidity was measured as 0.310 and it reduced to 0.179 at 22°C and 0.243 at 4°C. Measured pH value after harvest of berries was found to be 4.29 and that was determined as 4.18 at 22°C, and 4.10 at 4°C measured at the end of ripening

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EFFECT OF CRYOGRINDING ON THE COMPOSITION OF NIGELLA SATIVA SEEDS

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Extraction of essential oil from Nigella sativa seed after cryogrinding has been conducted by two different procedures: steam distillation assisted by microwaves (SDAM) and hydrodistillation assisted by microwaves (HDSM). The first method gives the best yields with reduction of extraction time and high amount of volatile fraction. The composition of the volatile oil has been investigated by capillary gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). HDSM process constitutes the adequate technique for the extraction operations from the yields and the high content in major component, and allows minimizing the energy consumption, the heating time and the formation of artefact products. So, it's profitable to treat some plants and seeds using this process for preserve their thermolabile components. In term of selectivity, the microwaves allowed to extract monoterpene and sesquiterpene hydrocarbons, and carbonyls compounds considered generally such as active and antioxidant components of essential oil. Our results indicate that the HDSM treated by cryogrinding reduced considerably the transformation of thymoquinone in thymohydroquinone. The proposed method provides more valuable essential oils; moreover, the thymoquinone percentage extracted is increased what allows to obtain oils more biologically active. The HDSM is a green technique since reduces environmental burden (less CO_2 in the atmosphere).

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P451

APPLICATIONS OF CHITOSAN IN FOODS

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Chitin, right after cellulose, is the second most important natural polymer in the world. It can be obtained from crustaceans, shrimp and crabs by chemical or microbiological processes. Chitosan is a modified, natural carbohydrate polymer derived by deacetylation of chitin. Chitosan has received considerable attention in recent years because of its biological activities such as antitumor, immunostimulatory, antibacterial, antifungal and hypocholesterolemic functions. In addition to these functions, chitin and chitosan possess several important technological properties such as thickening, flocculating, absorbing, emulsifying, clarifying, gelling and water or dye binding. This review summarizes the applications of chitosan in food industry. One of the most potent applications of chitosan is the inactivation of various microorganisms. In fact, it has been shown that chitosan has detrimental effect on bacteria such as Staphylococcus aureus, Bacillus cereus, Escherichia coli, Proteus vulgaris; yeast cultures such as Saccharomyces cerevisiae and Rhodotorula glutensis and numerous fungi except Zygomycetes. Chitosan has also been successfully used as food coating to improve food safety and shelf-life extension. Moreover, chitosan is also used as a protective barrier for moisture transfer from foods such as bread and eggs. The antioxidative activity of chitosan has also been shown in various foods, such as bread, fruits as well as foods rich in unsaturated lipids such as seafood and meat products. Moreover, chitosan acts as an emulsifier on products such as sausages and mayonnaise. One of the most interesting effects of chitosan is to act as the browning inhibitor on fruits and vegetables. And finally, chitosan is also used in fruit juice processing both as a clarifying agent and as a controller of acidity. In our laboratory, we have successfully used chitosan to clarify pomegranate juice.

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DETERMINATION OF PHENOLIC COMPOUNDS OF PERSIMMON FRUIT BY HPLC

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Persimmon (Diospoyros kaki L.), belonging to Ebenaceae family, contains high amount of phenolic compounds which have antioxidant property. The objective of this study is to determine the phenolic compounds and total phenolic content of six different Persimmon species' obtained from Ordu, Turkey. Turkay, Hachiya, 07 TH 13 and Morali were the astringent and Tozlayici and Fuyu were the non-astringent cultivars used in this research. HPLC was used to identify and quantify the phenolic compounds. The Folin Ciocalteau colorimetric method was used to determine total phenolics in persimmon fruits. It was found that total phenolic content of astringent species' was more than that of non-astringent species'. The phenolic compounds, identified and quantified in persimmons, were gallic acid, chlorogenic acid, rutin and catechin. Gallic acid ranged from 383.4 to 1.1 mg/kg in all persimmons. Chlorogenic acid was detected in Hachiya, 07 TH 13 Morali, Fuyu and Tozlayici and found to be 7.7, 32.8, 3.0, 3.0 and 21.5, respectively. Rutin was detected in Hachiya and 07 TH 13 and quantities of this phenolic were 13.1 and 10.5 mg/kg, respectively. Catechin was detected in Morali, Fuyu and Tozlayici and found to be 2.9, 2.7 and 7.1 mg/kg, respectively.

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ANTIOXIDANT ACTIVITIES OF GARLIC EXTRACTED WITH DIFFERENT EXTRACTION SOLVENTS

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This work is aimed to evaluate the effect of concentrations of EtOH as extraction solvents on the antioxidant capacities, such as electron donating ability (EDA), superoxide dismutase (SOD)-like activity, ACE-inhibition rate, nitrite scavenging activity, and reducing power. Electron donating abilities of extract from 70% EtOH were the highest. Extracts obtained from EtOH water mixture were shown to be significantly higher superoxide dismutase (SOD)-like activities than other treatment ($p<0.05$). Angiotensin-converting enzyme (ACE) inhibition was the greatest at 50% EtOH concentration ($p<0.05$). The extracts from 30-70% EtOH exhibited higher ferric reducing ability of plasma (FRAP) value than rest of the concentration ($p<0.05$). In case of nitrite scavenging activity, much higher scavenging activities were observed when the extraction was performed with EtOH or EtOH-water mixture ($p<0.05$). The results indicate that concentration of EtOH as extraction solvents can affect the antioxidant activity of garlic, which may provide useful information on the optimal solvent conditions for the extraction.

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BIOCHEMICAL AND PROTEOMIC CHARACTERIZATION OF PURIFIED QUINCE POLYPHENOLOXYDASE (PPO) FOR BIOSENSORS APPLICATIONS

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Polyphenoloxidase (PPO) (EC 1.14.18.1 and EC 1.10.3.1) constitutes a useful enzyme to set up biosensor tools with economic interest, particularly to detect and quantify phenolic compounds in food samples and environmental matrices. PPO based biosensors could help the control and on-line monitoring of food quality in industrial processes as well as the detection of pollutants, such as phenol derivatives and pesticides, even at low concentrations. In the present work, we attempted to extract, purify and characterize the PPO from local Tunisian quince (*Cydonia oblonga* Miller) fruits. Briefly, the quince PPO has been extracted using the TRITON-X114 and purified by three successive chromatographic columns: a first anion exchange followed by a hydrophobic chromatography and a final gel filtration step. Two forms of the enzyme, active and latent, have been identified using the activity tests in the presence and absence of sodium dodecyl sulfate (SDS) at 2 mM final concentration. The biochemical characterization of the purified PPO was established by determining the kinetic parameters (K_M and V_{max}) and studying the substrate specificity as well as a range of inhibitors effect on the enzyme activity. Moreover, the SDS-PAGE electrophoresis was investigated to determine the size and the activity of the bioactive molecules. The mass spectrometry (MS) analyses was undertaken to determine the elementary proteomic composition of the purified PPO fraction. The obtained results confirmed the presence of a common plant PPO as found by peptide sequence alignment and demonstrated with phylogenetic tree.

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THE EFFECT OF AIR DRYING ON SHRINKAGE AND COLOR CHARACTERISTICS OF MULBERRY (MORUS ALBA)

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Some drying behaviors (drying curves, shrinkage and color changes) of white mulberry (Morus alba) were studied for hot air drying. Mulberry was dried in a pilot plant tray drier with a constant air velocity of 1.2 m s^{-1} at 60, 70 and 80 °C. Constant rate drying period was not observed and the drying had occurred in two falling rate periods. The increasing temperature resulted with increasing of drying rate. Effect of temperature on the diffusivity was expressed by an Arrhenius relation with an activation energy 19.02 kj mol^{-1}. Mulberry did not exhibit uniform shrinkage throughout the drying. It followed two shrinkage periods, firstly fast shrinkage up to critical point then reduced degree of shrinkage at the later stage. It was found mulberry is a highly shrinkable fruit with around 80 % volume reduction. The color parameters for the color change of the materials were quantified by the L*a*b* color parameters. These values were also used for calculation of the total color change (ΔE*). All color parameters (L*, a*, b* and ΔE*) influenced by drying and caused to color shift towards the darker region.

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BIOCHEMICAL STUDY OF TUNISIAN LOQUAT (ERIOBOTRYA JAPONICA LINDL.) PEEL AND PULP POLYPHENOLS

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Rosaceae fruits are known for their antioxidant and free radical-scavenger ability and so other biological activities. Loquat tree is member of the botanical Rosaceae family. Its fruits are consumed world wide in different forms, fresh or transformed into jams, jelly, juices, etc. In this work, Tunisian loquat fruits have been studied for their phenolic compounds, particularly, in pulp and peel aqueous acetone extracts. Phenolic profiles and antioxidant potentials were evaluated on the basis of the scavenging activity of the stable 1,1-diphenyl-2-picrylhydrazyl radical (DPPH test) and compared with synthetic antioxidants, such as Trolox. Phenolic compounds were analyzed using Folin-Ciocalteu reagent and RP-HPLC technique. Significant differences in the chromatograms between pulp and peel extracts were observed. Loquat peel extract showed the highest phenolic content (275.11±18.74 mg/100 g of fresh weight). RP-HPLC analysis showed that peel and pulp extracts have many polyphenols in common, however, they present variations in quantity and composition of some polyphenolic compounds. The stronger inhibitory effect on DPPH radicals corresponded to the polyphenolic extract obtained from peel materials (84.59 % ± 2.53) which contains 0.60±0.018 mM Trolox equivalent per 100 g of fresh weight. Our results showed that Loquat fruit could constitute a rich source of antioxydant for industrial applications as functional additives or nutraceuticals.

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COLOR VALUES, TEXTURAL PROPERTIES AND SENSORY QUALITIES OF OVEN BAKED HYBRID POTATOES BRED FROM THE MARFONA VARIETY

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In this study, potato tubers cultivated from eight new hybrids of potato (Solanum tuberosum L.) plants derived from the Marfona variety, which was also used as control, were analyzed for their baking qualities. The potatoes were baked in an oven at 180 ºC for 25 minutes and evaluated for their color values, textural properties and sensory qualities. Hunter color values were measured using a colorimeter and textural properties were determined using a texture analyzer (TA.XT plus) equipped with a three point bend rig. Sensory qualities (texture, color, odor and taste) were evaluated by trained panelists. The two sample t-test was used to determine the significant differences between hybrid potatoes and the control and statistical evaluation was carried out using SAS software. Significant differences ($p<0.05$) were observed in hardness, fracturability, L, a, b and sensory values for the different potato samples. According to the sensory evaluation the control sample was superior in all quality aspects except for color. Of the eight hybrids studied, three samples ranked in the top three and one ranked the lowest for all characteristics evaluated by the panelists.

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EFFECTS OF NOVEL ELECTRICAL TREATMENTS ON COLOR IN FOODS

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Consumer's demands including new foods that are healthy, health promoting, convenient, easy to preserve, safer, and fresh or minimally-processed foods devoid of synthetic chemical preservatives influence the new trends of food processing techniques and methodologies for the manufacturing and preservation of foods. To address the need for safer and healthier foods or compete for consumer's acceptance, manufacturers are exploring new food processing and preservation methods including thermal and non-thermal electrical techniques. Electrical processing techniques affect the color of the foods. Their effects on visual color and colorants content such as chlorophylls, beta-carotene, lycopene etc. have been realized by several researchers. Non-thermal electrical methods such as PEF, electroplasmolysis generally are used to enhance the extraction yield in fruit and vegetable processing, resulting in the increase in the diffusion of color attributes to juice. Furthermore, thermal electrical methods such as ohmic, microwave heating are mild treatments causing less damage in color compared to conventional heating methods. In this study the effects of some electrical processes on color quality of foods and their future trends were reviewed.

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EFFECTS OF OZONE AND CHLORINE WASHES ON MICROBIAL INACTIVATION AND SOME QUALITY PARAMETERS OF SPINACH, LETTUCE, AND PARSLEY

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Demand for fresh-cut fruits and vegetables shows an increasing trend due to their health benefits and ease of consumption. In parallel with the increasing consumption, outbreaks of food-borne illness associated with fresh-cut produce have increased in recent years. Washing the produce with sanitizing agents such as ozone, chlorine, hydrogen peroxide, etc. that are safe for consumer health and effective in inactivating microorganisms would be a logical practice to prevent these cases. Protection of the product quality after treating with the agent is also needed. In this study, the efficiency of deionized, ozonated (12 ppm), and chlorinated (100 ppm) water in inactivating Escherichia coli and Listeria innocua on fresh cut lettuce, spinach, and parsley was investigated. The effects of these washing applications on chlorophylls, ascorbic acid, and total phenolic contents and antioxidant capacity of the vegetables were also determined. A 15 minutes of treatment time with deionized water resulted in a limited reduction (~ 1 log) in the numbers of both microorganisms tested, while maximum inactivation rates were observed in chlorine washes as 3 and 2.2 log units for E. coli and L. innocua, respectively. Ozonated water was moderately effective in microbial inactivation resulting in approximately 2 log reductions for both microorganisms. Results showed that washing treatments did not have any detrimental effects on the chemical components of the vegetables with the exception of slight reduction ($p<0.05$) in total phenolic content of spinach washed with chlorinated water.

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EFFECT OF DIFFERENT THAWING METHOD ON QUALITY OF FROZEN ARTICHOKE

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Freezing is an excellent and fairly widespread method for preserving food products, including fruits and vegetables, providing a high stability to health-beneficial micronutrients. However, the freezing of vegetables may alter quality characteristics such as flavour and texture, which in turn, could affect its marketing potential. Although the nutrients in frozen products could be protected more than in other storage methods. Fresh artichokes available to the consumer have typically spent a period of 3-7 days in retail distribution and storage before consumption. Thus, fresh artichokes can be exposed to a variety of conditions which offer the potential for change in quality characteristics, including nutrient content, before in-home cooking and consumption. On the other hand, artichokes for commercial freezing are frozen soon after harvest. This paper reports a study of the nutrient changes during the storage of fresh artichokes, over a period of week, and those of the corresponding frozen artichokes thawed two different methods, microwave oven and refrigerator conditions (±40 °C). Raw and frozen artichokes which were used in study were supplied from Özgörkey Gıda Ürünleri Sanayi ve ticaret Şirketi. Raw artichokes were stored at refrigerator conditions (4 ±10 °C) for one week and analysed were done in 0; 2; 4 and 6th days. Frozen artichokes were analysed after thawed by two different methods. In addition total moisture content, total acidity, ascorbic acid, total phenolic content and colour values were determined. The results show that there wasn't any statistical difference in total acidty and total moisture content. The highest ascorbic acid and total phenolic value were determined at thawing with microwave oven. Total phenolic contents of raw artichokes which stored at refrigerator conditions were found higher than frozen artichokes. During stored at refrigerator conditions the total phenolic contents of raw artichokes were increased.

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ANTIOXIDANT ACTIVITY OF SOUR CHERRY JUICE FROM CONCENTRATE

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Sour cherry (Prunus cerasus L.) is a fruit originated from of the Northeastern region because sour cherry nectar is one of the most popular juice drinks in Turkey. But, the information about antioxidant capacity is very limited. This study is conducted to determine the anthocyanins content and antioxidant capacity of 23 different sour cherry juices from concentrates which collected from main producing companies in Turkey. Brix degree and titratable acidity in concentrate samples were changed between 64.8-65.3 and 0.97-1.42 % respectively. At the 13.5 brix degree, total phenolic and monomeric anthocyanins contents varied from 952.3 to 1925.4 mg/L and from 101.9 to 361.0 mg/L respectively. The antioxidant activity of juice samples ranged from 13.93 to 23.53 TEAC mmol/L. As a result, the correlations of antioxidant capacity with total phenolic and anthocyanin content were investigated.

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THE EFFECT OF METHYL JASMONATE ON PHENOLIC PROFILES AND ANTIOXIDANT CAPACITY OF BUCKWHEAT SPROUT

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In this study it was shown that buckwheat sprout treated with methyl jasmonate (MeJA) synergistically enhanced the accumulation of phenolic compounds. The efficacy of spray of MeJA various concentrations and intensities during germination and growth of buckwheat sprout was assessed. Spray application of 0.1 mM MeJA at germination, or day 1 of growth was minimally effective resulting in approximately 5% increase in total phenolics and antioxidant activity (AOA). Treatment on each of the 3 days and 5 days of growth increased total phenolics by 40%. Results indicated that abiotic stress-induced phenolic compounds activity were dependent upon MeJA concentrations and exposure intensity. The total phenolics correlated with AOA. In addition, stresses affected the phenolic profiles. The different proportions of homoorietin, orientin, rutin and vitexin, for each stress, influenced the specific AOA of the phenolic profiles. The rutin was mostly affected by the methyl jasmonate treatment compared to vitexin, homoorientin or orientin. Exposure to combined abiotic stresses could provide more AOA to buckwheat sprout and be a less expensive alternative to genetic modifications and breeding programs.

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AMPEROMETRIC BIOSENSOR FOR GLUCOSE DETERMINATION IN APPLE JUICE. ANALYSIS OF INTERFERENCES

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Research on amperometric biosensors attracts lots of current interest because of their potential applications in the food industry. The objective of the present work was (i) to determine possible interferences of electro-active compounds found in apple juice; and (ii), when the interference was identified, eliminate or reduce it by the appropriate method. Carbon paste biosensors were prepared by hand-mixing glucose oxidase, graphite powder, paraffin, and ferrocene as mediator. Assay conditions were pH, 7; enzyme content, 10%; and applied voltage, 0.16V. Optimal working conditions were determined. The dispersion of enzyme in graphite was characterized using scanning electron microscopy (SEM, JEOL 6300F). The scanning electron microscopic (SEM) images were taken of the graphite surface before and after immobilization. Solutions of fructose, malic acid, sucrose, starch and ascorbic acid where added to the assayed buffer solution up to a concentration currently found in apple juice. Results indicate that the addition of fructose, malic acid, sucrose and starch do not interfere under these working conditions. Contrarily, ascorbic acid is a major interferent at the chosen potential. The reduction of ascorbic acid was performed enzymatically by ascorbate oxidase, previous to glucose determination.

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EFFECT OF EXTRACTION METHOD ON QUINCE (CYDONIA OBLONGA) POMACE PECTIN YIELD

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It is known that best quality pectin is obtained from pomace dried at low temperature. Moreover, blanching and reduction in oxygen content as that condition obtained by low-pressure superheated steam drying (LPSSD), reduce pectin color. The objective of this work was to determine the effect of blanching and drying method on the yield of quince pectin. A 2k-p fractional factorial designs technique was used to identify the influence of extraction conditions on pectin yield. In this case study, six factors were considered: pH (1.5 and 2.5); temperature (70° and 80°C); time (1 and 3 h); pomace pre-treatment (washing or blanching); drying method (conventional hot air or LPSSD); and pectin solution concentration (vacuum or ultrafiltration). Quince pomace was obtained by pressing cut fruits in a hydraulic press. Pomace aliquots were blanched at 70 °C; in water for 10 min. and individually dried (i) in a continuous rotary (45 rpm; air velocity, 1.0 m/s; and Tdr= 60 °C); or (2) in a LVSSD (45 rpm; 60 °C, 100mBar). Initial pomace moisture and final to initial water content ratio were 0.8 g/g and (X/Xo)< 0.07, respectively. Significant differences ($p<0.0001$) resulted for pH, temperature, concentration method and time, without interactions among factors.

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EFFECT OF PESTICIDE RESIDUES REMOVAL AND STERILIZATION ON WASHING OF CITRUSS BY THE ELECTROLYZED WATER AND THE AQUEOUS CHLORINE DIOXIDE

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To solves the problem of the chemical disinfectant which is indiscreetly used during the food material washing, the electrolyzed water (EW) and aqueous chlorine dioxide (ACD) that produced by sanitizing equipments in which the sterilizing power was excellent and it minimizes the available chlorine content were produced. The sterilization efficacy toward the microorganism of 42 kinds including the Aspergillus flavus KFRI 855, and etc. was evaluated. The EW and ACD were shown effective sterilization treatments of more than 99.999% against a bacteria and a mold and yeast. We could confirm that the surface microorganism of the orange in which it soaks and treats during 1 minute with the slightly EW (pH 6.5 level) of HClO content 30 ppm reduced less than 101 CFU/g. Degradation of the 7 pesticides including chloropyrifos by EW and ACD in citron were investigated in order to establish the effect of washing parameters. The removal ratio of pesticide residues according to the washing were the EW and ACD showed an effect more than 2∼3 times in comparison with the tap water processing (4.76∼25.48% level removal), and the removal ratio was exposed to be the some extent difference according to the chemical characteristic of pesticide and different washing parameters.

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PHYSICAL, TEXTURAL AND SENSORY CHARACTERISTICS OF HYBRID POTATOES BRED FROM THE MARFONA VARIETY

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In this study, potato tubers cultivated from eight new hybrids of potato (Solanum tuberosum L.) plants derived from the Marfona variety, which was also used as control, were analyzed. A texture analyzer (TA.XT Plus) equipped with a 10 mm diameter cylindrical probe was used to measure the maximum force required for 50% compression of 1 cm thick slices of boiled whole potatoes in order to determine the boiling time necessary for cooking. Time of cooking was defined as the boiling time required for achieving a maximum force below 400 g. Hybrid potatoes had a minimum cooking time ranging between 13-21 minutes and the control cooked in 22 minutes. After cooling, fracturability and hardness values were also determined using a three point bending rig. Color (L, a, b) of potatoes were measured (Minolta CR-400) according to the Hunter system. Sensory evaluation (odor, taste, color, texture and degree of cooking) of potatoes were also performed. The two sample t-test was used to determine the significant differences between hybrid potatoes and the control and statistical evaluation was carried out using SAS software. Significant differences ($p<0.05$) were observed for Hunter color, hardness and sensory values obtained for some or all of the potato samples studied.

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ULTRAFILTRATION OF APPLE JUICE: ANALYSES OF PERMEATE FLUX AND TOTAL RESISTANCE

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Depectinized apple juice was clarified by cross-flow ultrafiltration using a 10 kDa membrane. The combine effects of temperature, transmembrane pressure and pretreatment with gelatin and bentonite on initial permeate flux and total resistance was evaluated using response surface methodology. Studied ranges of gelatin-bentonite concentration, temperature and transmembrane pressure were 0:0-300:1500 mg/L, 20-40°C and 100-300 kPa, respectively. Significant regression models describing the changes of initial permeate flux and total resistance, with respect to the independent variables were established, with the coefficient of determination, R^2, grater than 0.9. Permeate flux and total resistance was influenced strongly from all the variables studied. Permeate flux was significantly improved by pretreatment of apple juice with gelatin and bentonite as well as increasing both temperature and transmembrane pressure. The results indicated that the gelatin-bentonite concentration was the most important factor affecting the total resistance, and there was a significant decrease in total resistance in case of pretreatment with gelatin and bentonite. Total resistance also decreased with increasing temperature. However, it increased in parallel to increasing transmembrane pressure.

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DESIGN AND CONSTRUCTION OF A MACHINE FOR EXTRACTING POMEGRANATE ARILS

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An Extracting Machine was designed to achieve ease of separating pomegranate arils, cost effectiveness, labor and time efficiency, hygiene and food safety. The method used in this study is based on cutting the fruit into two halves and then extracting the arils with the aid of pressurized air-jets existing from a nozzle with an especial moving pattern. This unique plant operated satisfactorily, extracting almost all arils from the fruit with minimal damage to them. The results showed that air pressure and nozzle diameter had significant effects (P = 0.01) on the percentage of extracted and damaged arils. The results showed that the maximum extracting efficiency of the machine were 98.66% related to the air pressure of 8 bar and with a nozzle diameter of 3.5 mm. However, the optimum air pressure with good extracting efficiency and minimum damage to arils was 7 bar.

Keywords: Extracting machine, pomegranate arils, pressurized air-jets, extracting efficiency.

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ORGANIC ACID AND AROMA COMPOUND OF GRAPE VINEGARS PRODUCED WITH DIFFERENT TECHNIQUES

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There are many types of vinegars made from various fruits, rice, starch and sugar. There are mainly two vinegar production methods; one is slow method in which the culture of acetic acid bacteria is placed on the surface of a barrel (traditional method) and the other one is quick process involving submerged culture where the oxygenation has been greatly improved (industrial method). Formation of organic acid and aroma compounds are very important in fermented products. Ulugbey Karasi, is a type of red grape that is unique to Isparta region in Turkey. The aim of the study was to determine the effects of traditional and industrial vinegar production methods on organic acids and volatile aroma compunds of vinegars derived from "Ulugbey Karasi" grapes. In this study, grape vinegar was produced through traditional surface and industrial submerge methods techniques from "Ulugbey Karasi" grapes. Quantity of organic acids was determined using HPLC with DAD detector, and aroma compounds were identified with gas chromatographic method. Acetic, tartaric, lactic, citric, and succinic acids were determined in vinegar samples. The concentrations of acetic acid were 143.6 g/L and 82.81 g/L in industrial grape vinegar and traditional grape vinegar, respectively. The amount of tartaric acid ranged between 1570.9-1810.4 ppm in traditional grape vinegar samples while industrial grape vinegar contained 1826.6-2245.4 ppm. The amount of citric acid in industrial grape vinegar was higher than that of the traditional grape vinegar. Acetaldehyde, acetone, ethanol, hexanal, acetic acid were determined in all grape vinegar samples. Acetaldehyde levels in industrial and traditional vinegar samples were 0.71 ppm and 0.67 ppm.

Keywords: Traditional grape vinegar, Organic acid, Aroma compounds

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TEXTURE EVALUATION FOR A COMMERCIAL CHILI-BASED PASTE

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Chili shrimp paste (CSP) is a traditional Southeast Asian condiment conventionally prepared using a granite mortar and pestle. It is a semi-solid suspension which contains chunky chili pieces. Textural characteristics of the pastes are important quality parameters for consumers as they prefer pastes with a certain degree of thickness and chunkiness. Unfortunately, there is no standard methodology available to evaluate textural properties of such pastes. The objectives of this study were to establish a method for size reduction of chilies suitable for commercial production of CSP and to determine the typical textural properties of CSP preferred by consumers. Various samples of CSP were prepared and evaluated through sensory and instrumental evaluations (back extrusion method and vane in cup). Chili shrimp pastes prepared using the super mass colloider can substitute traditional pastes prepared by manual pounding in mortar. The milled CSP can produce a uniform paste, similar to the traditionally mortar pounded CSP samples but with the advantage of a higher production capacity. Both instrumental (textural measurement) methods were found to be reliable and consistent methods which can be applied in quality control for textural properties of CSP in a commercial-scale production set-up.

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ANTHOCYANIN AND ORGANIC ACID PROFILES OF MAJOR POMEGRANATE VARIETIES GROWN IN TURKEY

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Although Turkey is the major grower of pomegranates and many different pomegranate varieties are grown in Turkey, quantitative data on the anthocyanin and organic acid contents of pomegranate varieties is lacking. Therefore, monomeric anthocyanin contents, and anthocyanin and organic acid profiles for nine registered pomegranate (Punica granatum Linn.) cultivars were determined in this study. Since the color was the most important quality criteria for pomegranates processed into juice, monomeric anthocyanin contents were also determined. The pomegranates contained between 46 and 405 mg L–1 monomeric anthocyanins. Highest anthocyanin content was found for Izmir 1513 pomegranate variety, followed by Izmir 1264 and Hicaz varieties. Moreover, in this study anthocyanin and organic acid profiles of pomegranate varieties were also determined by high performance liquid chromatography (HPLC). The five major anthocyanin compounds were identified in pomegranate varieties. For example, in Hicaz variety cyanidine-3, 5-diglucoside (55%) was the major anthocyanin and the other anthocyanins were in descending order: Cyanidine-3-glucoside (26%), delphinidine-3,5-diglucoside (8%), delphinidine-3-glucoside (5%), pelargonidine-3,5-diglucoside (3%) and pelargonidine-3-glucoside (2%). Also, the five major organic acid compounds were determined in pomegranate varieties, but four of which were identified. For example, HPLC analyses of Hicaz variety showed that citric acid (73.9%) was the major organic acid, followed by malic acid (9.3%), sucsinic acid (8.9%), non-identified acid (7.9%) and tartaric acid (0.12%). Also, this study showed that there was an excellent correlation between the titratable acidity and organic acid content of pomegranate varieties (r=0.9640). In conclusion, this study demonstrated that anthocyanin and organic acid content of pomegranates are cultivar-dependent.

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ANTIOXIDANT ACTIVITY AND SENSORY QUALITY OF ORGANIC AND CONVENTIONAL MANDARIN JUICE, CV. OROGRANDE

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Currently consumers demand organic products because they believe are more flavorful and respectful to both the environment and human health. Therefore we studied the effects of organic farming on the antioxidant capacity of samples of mandarin. The antioxidant capacity was determined by the ORAC-FL method and the sensory analysis was performed by a panel of 10 panelists, ages 20 to 50 years (8 female and 2 male) with sensory evaluation experience. Organic farming resulted in significantly higher antioxidant activity compared to conventional farming, with values being 0.076 ± 0.003 mMTrolox μL-1 of juice and 0.053 ± 0.002 mMTrolox μL-1, respectively also the trained panel established that the quality of both juices was high but that organic juice had slightly higher intensities of color, fresh mandarin juice aroma, and floral aroma than conventional juice. In conclusion, organic farming had positive effects on the quality of mandarin juices, cultivar Orogrande.

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LOW CALORIES FUNCTIONAL DRINK FROM CARROT JUICE FERMENTED BY MANNITOL PRODUCING LACTIC ACID BACTERIA

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Carrot juice from Daucus carota L. is one of the most popular and well-known vegetable drink, rich in vitamins and minerals. Carrot may protect humans against certain types of cancer and cardiovascular diseases. The objective of study was the fermentation of carrot juices with lactic acid bacteria able to produce mannitol. Juices were pasteurized for 15 minutes at 80°C and inoculated with growing cultures of Lactobacillus brevis, Leuconostoc mesenteroides or Leuconostoc citreum (1-10% v/v). The fermentation of carrot juices was conducted at 30°C for 24h. During this process the concentration of carbohydrates, pH changes, titrable acidity, mannitol production and viable cell count were examined. Obtained results showed that studied strains were able to convert from 50 to 90% of carbohydrates from carrot juice into mannitol - low-calorie sweetener with prebiotic and antioxidant properties. Our results shown that application of mannitol-producing lactic acid bacteria for fermentation of carrot juice could be a good method for obtaining functional food with extra nutritional value.

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THE EFFECT OF POTATO - PREHEATING AND HYDROCOLLOIDS ON THE QUALITY OF FROZEN FRENCH-FRIES

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To improve the quality of frozen french-fries, a potato (Solanum tuberosom L.) cultivar Agria was chosen from Faridan region in Isfahan province and transferred to cold storage at temperature of 5+0.5 °C and RH of 85-90%. Specific gravity and dry matter of potato tubers were determined by AOAC method and reducing sugar content was analyzed by high performance liquid chromatography (HPLC). The potato strips were blanched in hot water at 70 °C for 4 min, 70 °C for 10 min, and 95 °C for 2 min, and then deep-fat fried in oil at 175 °C for 2 min. Product quality characteristics such as texture, color, and oil absorption were determined. From a preliminary study, the 70 °C-10 min blanching treatment was selected as the optimum preheating condition. Before frying in hot oil, the potato strips were immersed in different concentrations of hydrocolloid solutions such as gelatin, carboxy methyl cellulose (CMC), whey protein concentration (WPC), pectin and starch. The results showed that 5% pectin, 0.5% CMC, and 5% starch were more suitable treatments than the others. Two-layer coating (pectin-starch) had a significant effect on quality improvement. During a 6-month storage with the oil extracted from french-fries, samples treated with the two-layer coating exhibited less changes in quality attributes than the others. After a 4-month storage, the oil deterioration of the french-fries increased.

Keywords: French- fries, oil absorption, preheating, hydrocolloid.

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NATURAL BIOACTIVE PHENOLICS AS ANTIOXIDANT IN FRACTIONATED MUTTON TALLOW

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Edible sheep tail fat was effectively fractionated by acetone crystallization. Liquid fraction was analyzed for refractive index, percentage of free fatty acids, iodine value, peroxide value, saponification number and fatty acids composition. Antioxidative activities of some phenolic acids were studied in sheep tail fat olein at 150 °C at 0.004 %, 0.006 %; 0.008%; 0.01%; 0.02% and 0.045% concentration, by measuring induction time. It was found that some phenolic acids significantly increased the oxidative stability of sheep tail fat olein. Among phenolic acids investigated, only salicylic acid showed no antioxidant activity which is in contrast to all other antioxidant compounds. Antioxidant efficiency has been shown to be very dependent on the number of phenolic hydroxyl groups in the molecule and also to be promoted by steric hindrance. The results showed that, in sheep tail fat olein, the antioxidant activity of the tannic acid is comparable to α-tocopherol (as standard) whereas gallic and caffeic acid are much more potent than standard compound. On the basis of the results, it was found that gallic and caffeic acid significantly increased the oxidative stability of sheep tail fat olein. The stabilized sheep tail fat olein with gallic or caffeic acid can be considered as an alternative to commercial frying oils.

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PRODUCTION OF PLANT OIL BY EXTRUSION

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Production of Plant Oil by Extrusion Extruder treatment of oil materials is one of the perspective system plant oil productions. We offer the new extruder, that permits to ensure damaging cellular structure of the oil seeds with oil excretion and its heating by the mechanical energy dissipation and oil wringing. Damaging, heating and wringing of the seeds supplies in consideration of compression and shear stress in the screw type machinery. To the oily material influences high pressure, temperature and during this oil wringing is occurs. Operation of the machinery theoretical described and collected big experimental material, in the issue, which involved advanced sample of the extruder. Extrusion of the mathematical model is submitted as difficult thermodynamic process. By the temperature influence wringing material changes its physical-mechanical properties, and effects to the process of the oil separation. Results of the researches showed that ability of the high food quality achievements by new method of extrusion of the plant raw material. Optimum technological and constructive settings of extrusion installed, that allows decreasing power consumption process of the plant oil.

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MATURATION EFFECT ON FATTY ACID COMPOSITION OF OLIVE OIL

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Olive oil is a kind of edible oil which especially contains high ratio of unsaturated fatty acids and has positive health effects for daily nutrition. This characteristic makes it one of the important factors of Mediterranean type of nutrition. Olive oil is characterized with its mono unsaturated fatty acids quantity. In addition to this, the fatty acid composition is one of the essential criteria for defining olive oil. The essential fatty acids of olive oil are oleic, linoleic, palmitic and stearic acids. With 65 to 85% of oleic acid and 4 to 15% of linoleic acid olive oil takes place in oleic-linoleic oils group. Generally, accumulation of fatty acids in the maturation period of the fruit occurs in decreasing way and fatty acid composition of olive oil determines organoleptic quality. As maturation improves and when fatty acid composition changes, especially, proportion of lineloic acid increases. In contrast to the first period of maturation mainly palmitic and linoleic acids increase in the last period, while oleic acid decreases. Changes observed in the fatty acid composition of olive oil affects its oxidation stability, organoleptic characteristics and its positive health effects. Thus, the effect of maturation on fatty acid composition must be determined.

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COMPARISON OF OILS FROM ROASTED AND UNROASTED HAZELNUT GROWN AS ORGANIC AND CONVENTIONAL AGRICULTURAL METHODS

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The aim of this study is to compare the free fatty acid, peroxide value, refractive index and oxidative stability of oils from roasted and unroasted hazelnut derived from organic and conventional agricultural methods in the same location in Turkey. The samples were roasted using a drying oven at air temperatures of 150°C which represents the range at 30 minutes. The oils were obtained from roasted and unroasted hazelnut from organic and conventional samples by pressing. Free fatty acid, peroxide value, refractive index and oxidative stability of the oils ranged from 0.25 to 0.49 %, from 0.62 to 1.80 meq O2/kg oil, from 1.46916 to 1.46926 and from 19.16 to 26.63 h, respectively. The results showed that there were no consistent differences between the overall properties according to comparison of cultivation types. There were statistically important differences between roasted and unroasted samples for free fatty acid and peroxide values. While the lowest free fatty acid was found in roasted samples, the lowest peroxide value was in unroasted hazelnut oil. The stability results showed that a difference among each of them, but it was not found important differences among cultivation types and roasting process.

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CHEMICAL PROPERTIES AND SENSORY EVALUATION OF FLAVOURED EXTRA VIRGIN OLIVE OIL

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Virgin olive oil is the only edible oil of great production obtained by physical methods from the fruit Olea europaea L., it shows sensory characteristics and nutritional properties which are the main reasons for the increment of its consumption all over the world in the recent years. Olive oil is one of the most appreciable and precious oils with its delicious aroma and taste. Flavoured extra virgin olive oils either prepared by adding natural flavouring substances to extra virgin olive oil at various concentrations or macerating olives with aromatic herbs are recently produced as gourmet oils. In this study; the oils were prepared by adding of various natural flavouring substances such as thymus, basilica, rosemary and bitter-orange at different levels of concentrations to extra virgin olive oil. The following parameters were determined: free fatty acid content (oleic acid %), totox value, K232, K270, oxidative stability and sensorial characteristics. The results showed that natural flavouring substances improved the stability of the extra virgin olive oil. Panelists preferred the oils flavoured with 0.05% of thymus and 0.07% of basilica, rosemary and bitter-orange.

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MEMBRANE DEGUMMING OF CRUDE SOYBEAN OIL WITH POLYVINYLDENEFLUORIDE MEMBRANES

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The use of membrane technology as an alternative processing technique to conventional degumming of oils presents various advantages which are diminished energy consumption and minimized amounts of waste water production, elimination of increased temperatures and contacts with chemical agents, etc. In this study, the feasibility of membrane degumming of crude soybean oil was investigated. A PCI membrane module was used which was equipped with polyvinyldenfluorid membranes having a molecular weight cut off 20kDa. The influence of the process parameters such as temperature, pressure, feed velocity and volume-concentration ratio, in terms of the permeate flux and phospholipids rejection, were investigated. Also, the changes in quality parameters of degummed oil such as lovibond colour values, peroxide value, phosphorus and free fatty acid content were determined. Phospholipids content of crude soybean oil was reduced from 718 ppm to less than 125 ppm by membrane degumming and phospholipids rejection was measured as more than 78%. Free fatty acids were also removed during membrane degumming. The removal of lovibond yellow and red colour units was determined as 20% and 50% respectively. Membrane technology was found to have good potential in crude soybean oil degumming.

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DETERMINATION AND COMPARISON OIL LOST IN OLIVE POMACE FROM DIFFERENT OLIVE OIL EXTRACTION SYSTEMS: A CASE STUDY OF KAHRAMANMARAS PROVINCE IN TURKEY

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A statement of the objectives of the study is to compare three different olive oil extraction processes used in seven olive oil plants at Kahramanmaras province, Turkey to assess the influence of different processing on oil. lost in pomace by-product of olive oil production. The oil extraction systems included traditional (hydraulic press) and modern systems (three-phases and two-phase-ecological system). Samples were taken with 15- day intervals in four different periods from November to February in on-year of olive oil campaign period. The results obtained from the system basis for comparison SAS program (v9) is used. "Nested Analysis of Variance" statistical methods have been used. Statistically significant differences were found both between systems and within system in terms of oil loss in olive pomace. A summary of the results obtained that there is no differences between foreing and domestic brands of olive oil-producing machinery in terms of oil loss in olive pomace.

Keywords: By-products, olive pomace, olive oil, nested design, SAS, olive extraction systemes, oil loss, foreing brand and domestic brand olive oil-producing machinery, on-year, Kahramanmaras, Turkey.

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EVALUATION OF N-ALKYLATED CHITOSAN MICROSPHERES AS SUPPORT FOR IMMOBILIZATION OF RHIZOMUCOR MIEHEI LIPASES

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Lipases have been widely accepted as biocatalysts for the modification of oils and fats being of current interest to scientists and industrials, particularly to obtain trans-free fats and oils. An additional advantage is obtained when immobilized enzymes are used. In this work, biological catalysts, suitable for producing structured lipids from sunflower oil and saturated fatty acids (palmitic-stearic), were prepared. To that purpose, chitosan microspheres were performed by precipitation and hydrophobically modified in different degree by reductive amination. Different aspects of that last procedure were analyzed in order to obtain the most appropriate support for lipase immobilization: amination time, aldehyde concentration and their interaction. Lipases from Rhizomucor miehei were physically adsorbed on the prepared supports, and the catalytic activity of these enzyme derivatives was evaluated using acidolysis reaction in a solvent system. The effect of the protein content in the biocatalysts and the stability of their reuse was also investigated. The most active biocatalysts, with medium modification degree, achieved a change in the composition of palmitic and stearic acid from a value of 9.56% in the original oil to 54.25% in the final structured lipid. This high conversion was maintained during 3 practiced reuses. This demonstrated that chitosan modification was effective.

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ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF FLOWERS OF IRANIAN CULTIVARS OF CARTHAMUS TINCTORIUS L

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This study was carried out to evaluate antioxidant and antimicrobial activity of followers of four Iranian varieties of safflower including Arak2811 Zarghan279, Isfahan14 and Varamin295. The flower were dried and extracted with methanol and water mixture. Ferric reducing antioxidant power and β-carotene bleaching assay were used to determine antioxidant activity. Antibacterial potential of extracts was determined with Broth Dilution method. Result showed Arak2811 had highest antioxidant activity in both experiment as Its FRAP value and EC50 in β-carotene bleaching were 0.32±0.02 Fe2+/mg dry weight and 2068.44±15.64 ppm respectively. Enumeration of bacterial strains showed inhibitory effect of extract of safflower flower. MIC and MBC of safflower flower extract against Salmonella typhi were 60 and 240 mg/ml respectively. Isfahan14 variety was more efficient and decreased log cfu/ ml to 3.77±0.05. MIC against Staphylococcus aureus and Salmonella typhi were 30 and 60 mg/ml respectively. It was concluded that studied flowers could be used as a natural additive in production of food. In this research antioxidant and antimicrobial activity of methanolic extract of safflower flowers were studied. FRAP and β-carotene bleaching assay showed that Arak2811 had more antioxidant than other varieties but Isfahan14 was more efficient in antibacterial assay.

Keyword: Safflower, FRAP, broth dilution method

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P500

FATTY ACID COMPOSITIONS AND SOME CHEMICAL PROPERTIES OF THE OIL FROM TWO WILD ALMOND SPECIES

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Fatty acid (FA) profiles and some chemical properties of the oils extracted from one wild species of almond (*Amygdalus haussknechtii*) and also two other wild species of almond (both from *A. scoparia* collected from two different regions of Iran) were investigated. A commercial species (*A. dulcis*) was also considered for comparison purposes. The oil contents among these species varied from 42.5% to 49.5%, w/w. The major unsaturated fatty acid (USFA) in all tested species was oleic acid (66.7-69.7%) followed by linoleic acid (18.2-23.0%). Palmitic acid as main saturated FA was measured at 7.1-9.5%. Calculated iodine values were from 88.8 to 96.1. Saponification values for these oils varied from 173.5 to 192.9. Levels of monounsturated FA (MUFA) in the oils extracted from wild almonds were found to be higher than those reported for some other nuts. Higher levels of MUFA and also linoleic acid suggest that kernel oil from wild almond species is a nutrient vegetable oil that can probably reduce the risk of cardiovascular diseases. Moreover, FA profiles of these oils indicate that they may have better stability during the storage because of high ratio of MUFA to PUFA.

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P501

EFFECT OF GUM ARABIC CONCENTRATION AND XANTHAN GUM ON THE DROPLET SIZE DISTRIBUTION, SIZE INDEX, CLOUDINESS, CREAMING INDEX AND MICROSTRUCTURE OF THE POMEGRANATE-SEED-OIL-IN-WATER EMULSION

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Pomegranate seed oil (PSO), which is a powerful health-benefiting agent (due to its anti-oxidative, anti-cancer and anti-lipidemic properties), was considered as a clouding and functional agent for beverages. For this purpose, an oil-in-water emulsion should be prepared with a significant physical stability over the shelf-life of the product. In this study the PSO-in-water emulsions were prepared according to the following formula: PSO 6.0% (w/w) and different levels of gum Arabic (GA) concentration (10.0, 12.5 and 15.0%, w/w). Xanthan gum (at 0.2%) was also considered in some formulas. Droplet size distribution, creaming index, cloudiness, size index and the microstructure of the emulsions were investigated during 6 weeks of storage. Among the samples without xanthan gum, emulsions with 15.0% GA showed a fairly narrower droplet size distribution and less creaming index. The changes in the cloudiness in the emulsions with 15.0% GA were more obvious than those of the others but, the initial cloudiness levels for these formulas were higher when compared to two other emulsions. Droplet size distribution of the formulas containing both GA and xanthan gum were more stable during the storage time (42 days).

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P503

APPLICATION OF LAVANDULA ANGUSTIFOLIA ESSENTIAL OIL AS NATURAL ANTIOXIDANT IN CRUDE SOYBEAN OIL

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Because of adverse effects of synthetic antioxidants, there is a tendency to replace these materials by natural products, especially medicinal plants. The aims of this study were: (i) to determine the major components of the Lavandula angustifolia essential oil (LAEO) (ii) to evaluate the antiradical activity of LAEO by DPPH°, ABTS°+ and β-carotene bleaching assays and its antioxidant activity (AoA) in soybean oil. Methods: LAEO was analyzed by GC/MS and its main chemical components were identified. AoA of essential oil was determined by DPPH°, ABTS°+ and β-carotene bleaching methods and its AoA in crude soybean oil was studied by Oven method. Results: Five predominant compounds were identified (linalool (27.89%), camphore (10.82%), 1, 8 cineol (9.05%), linalol acetate (8.86%) and borneol (7.29%)) in essential oil. In DPPH° assay, EC_{50} of LAEO was 35.54 ± 1.58 mg/ml. In ABTS°+ assay, maximum AoA was related to 4 % of LAEO (66% inhibition, 0.13 mg/ml ascorbic acid equivalent). In β-carotene bleaching test, maximum AoA of essential oil was related to 1 % of essential oil (52.6 % RSA). In the oven test, LAEO was able to prevent production of oxidation products in crude soybean oil.d LAEO (at 800 ppm) acts as well as BHT at 200 ppm. Conclusion: Antioxidant activity of LAEO was proved, and after complementary tests, it can be used as a natural antioxidant in food especially in edible oils.

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P504

CHOLESTEROL OXIDES IN FOOD

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Cholesterol present in food of animal origin can be oxidized leading to the formation of more than 30 compounds, generally called COPs (cholesterol oxidation products). COPs have received much scientific attention due to their undesirable implications in human health. COPs are present in many food preparations, especially those containing high levels of cholesterol (e.g. egg, milk, meat, fish products). Technological treatments can increase cholesterol oxidation (e.g. frying, spray-drying). In addition, inadequate storage can drastically increase the COP content. Analytical methods to quantify COPs in food include extraction of total lipids, followed by enrichment, separation, and detection of COPs. The most controversial step is the enrichment in cholesterol oxides, which is commonly implemented by saponification or chromatography (e.g. GC or HPLC). The 7-K content of the whole egg powder is the highest one among the analyzed food products, which is partly due to its elevated lipid percentage (44%). Contents of COPs in milk and dairy products is very small. A higher concentration of COPs can be found only in processed dairy products exposed to harsh storage conditions where the impact of oxygen and light or oxygen and low water activity are concomitant.

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P505

VISUALIZATION OF THE GLUTEN DISTRIBUTION IN DOUGH BY USING THE EXCITATION-EMISSION MATRIX

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The distribution of gluten in dough is an important factor determining the texture of bread. The objective of this study is to visualize the gluten distribution in the cross-section of dough without staining, through the application of the excitation-emission matrix (EEM). EEM is a set of data composed of fluorescence intensities of a sample measured at consecutive excitation and emission wavelengths, and its unique contour pattern enables the precise specification of constituents. In this study, the cross-sections of bread dough, extracted gluten and starch were photographed with a CCD camera at excitation and emission wavelengths ranging from 260nm to 320nm and 370nm to 450nm respectively, giving the EEM data of each pixel. The gluten and starch samples served as references. The cosine similarities between each pixel of dough and the references were calculated in terms of EEM. Each pixel was assigned a specific color according to their similarity value, showing up the areas with high similarities to gluten. The same dough was stained with rhodamine B and FITC for gluten and starch respectively. The cosine similarity image and the stained image closely resembled each other, verifying the validity of the EEM imaging method.

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P507

DEVELOPMENT OF SHELF STABLE IRANIAN BARBARI BREADS USING HURDLE TECHNOLOGY

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Barbari is one of the common flat breads in Iran which has short shelf life as other flat breads. Hurdle technology has been recently developed to produce the safe, shelf stable, nutritious, delicious and economical foods. It advocates the intelligent use of combinations of different preservation factors or techniques (hurdles) in order to achieve multi-target, mild but reliable preservation effects. In this investigation the effects of polyol (glycerol at 1 and 5% flour basis), emulsifier (distilled monoglyceride at 0.3 and 0.7% flour basis), hydrocolloid (xanthan at 0.3 and 0.7% flour basis), and packaging (two different materials consist of one monolayer and double layer packages) on shelf life and quality of Iranian Barbari bread were evaluated as hurdle techniques in different levels. The effects of selected levels on quality characteristics of the bread showed higher quality in specific volume, water activity, hardness, moisture, organoleptic properties and shelf life of the Barbari bread. The quality and shelf life improved by combining addition of these hurdles (propylene glycol at 5%, sodium stearoyl lactylate at 0.7%, guar at 0.7% and double layer package) than individual addition of them. Hurdle treatment significantly decreased water activity and hardness of fresh Barbari breads. Specific volume of fresh breads was not affected by Hurdle treatment, while it significantly increased the moisture content of the bread. Evaluation of crumb hardness and moisture indicated that hurdle technology were able to diminish the bread staling. Acceptability of the breads, as indicated by panelists, was found to be higher than control bread. Results showed that hurdle technology can present the greatest effect on quality and shelf life of Iranian Barbari bread.

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P508

ISOTHERMAL AND SHORT MASHING COMPARED TO INFUSION MASHING

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The most important process in beer production is the fermentation of the sugars in the wort. Mashing is the process for wort production from grist. Traditional mashing involves three temperature steps. During 16 case studies the mashing process was investigated to see if it can be performed at one temperature (60-65 °C) and shorted to half of the normal mashing time. Also, the effect of mash pH adjustment and application of exogenous enzymes was studied. The mashing processes were extensively monitored. Worts of short- and long-duration isothermal mashes and of traditional mashes contained comparable amounts of extract and fermentable sugars and the brewhouse yield was in the same range. Free amino nitrogen (FAN) of wort of isothermal mashes was slightly lower than the FAN of wort of traditional mashes but still high enough for the fermentation process. Wort of isothermal mashes adjusted to a mash pH of 5.4-5.6 had a final FAN that equalled the FAN of wort of traditional mashes. The colour of the wort of isothermal mashes was lighter, especially for the short-duration isothermal mashes. Addition of exogenous enzymes to the mash did not result in a higher extract yield but gave a 50% higher FAN.

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P509

PHYSICAL, TEXTURAL AND SENSORY EVALUATION OF NOODLES PRODUCED FROM SEMOLINA, WHEAT AND BUCKWHEAT FLOUR

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In this study, textural (firmness and work of shear), physical (increase in volume, total organic matter released from cooked noodle, water absorption) and sensory analyses (color, texture, taste and overall appreciation) were carried out on different types of noodles produced from semolina, buckwheat, wheat flour with water or egg as binder. Cooking times were determined by crushing cooked noodles between a pair of glass plates until the white hard core in the noodle strands disappeared. Firmness and work of shear were determined using a TA.XT Plus with 1mm flat perspex knife blade according to AACC (16-50) standard method. Results were statistically evaluated using SAS software. Significant differences ($p<0.05$) were observed in both firmness and work of shear values for different noodles. Using egg as the binding agent increased firmness and work of shear for wheat and buckwheat noodles. Buckwheat flour noodles had the lowest volume increase upon cooking whereas semolina noodles had the highest. Total organic matter released from wheat noodles during cooking and water absorption values for buckwheat noodles were the lowest among other samples. Noodles produced from semolina were the most appreciated in terms of sensory characteristics. Although edible, buckwheat noodles were not particularly preferred by the panellists.

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P510

MECHANICAL CHARACTERISTICS OF PASTA ENRICHED WITH FULL FAT SOY FLOUR

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Durum wheat flour is the main ingredient in the formulation of pasta products; however, it is deficient in lysine. Therefore, many researchers have focused on improving of pasta quality by addition of ingredients. Soybean has many valuable components and consumption of soybean products is useful for bone's health, healthy brain, immune function, controls the heart attack and some cancers. The objective of this paper was to study the mechanical properties of enriched spaghetti. Influence of FFSF (0-27.0), water content (31.0-35.0 g/100g) and extrusion conditions on the mechanical characteristics of spaghetti were evaluated. Process was performed with screw speed of 10-40 rpm and water circulating temperature of 35-70 °C. Addition of FFSF and extrusion processing conditions influence the texture of spaghetti. This enrichment resulted in significant differences ($P \leq 0.05$) in mechanical sterength All predicted models for mechanical strength showed high ($R2 \geq 75.0$). These results suggested that temperature of circulating water and screw speed of extruder had no significant effect independently on the textural characteristic of spaghetti containing FFSF. Whereas, interaction between components and process variable had negative effect on the mechanical strength.

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P511

INFLUENCE OF WHOLE SOY FLOUR AND EXTRUSION CONDITION ON THE MICROBIAL QUALITY OF SPAGHETTI

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The influence of the addition of full fat soy flour (FFSF) and processing conditions on the microbial properties of spaghetti were evaluated. The samples of spaghetti were produced by FFSF in range of 0-27.0 g/100g and water content in the range of 31.0-35.0 g/100g moisture. For this reason the microbiological quality of these products included the determination of APC (Aerobic plate counts) at 35 °C and yeast and mold counts at 28 °C are Analyzing. Results showed that the total counts of the samples ranged between 10^3 – 5x 10^4, which is in the range of its national standards (ISIRI standard # 2393) but for mold counts the results showed a slightly higher value than the national spaghetti standard, the counts ranged in about 10 4, the molds mostly detected were Aspergillus, Penicillium and Fusarium. The reason for this is assumed to be the soy flour used which has to be prepared by GMP (good manufacturing methods) methods to increase the microbiological quality of the raw material used.

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P512

INFLUENCE OF FULL FAT SOY FLOUR ON THE ACIDITY CONTENT OF SPAGHETTI DURING STORAGE

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Durum wheat flour that is the main ingredient in the formulation of pasta products, however, it is deficient in lysine. Therefore, many researchers have focused on improving the nutritional of pasta by the addition of other ingredients. Soybean is a valuable source for soluble carbohydrate, proteins (rich in lysine) lipids, dietary fiber, minerals and vitamins. In previous studies we have investigated the effect of full fat soy flour on the quality characteristics of spaghetti and the objective of this paper was to determine the effect of storage on the acidity content of enriched spaghetti. Spaghetti samples after produced in a laboratory pasta maker cooked for optimum and over cooking time and acidity of cooking water was measured by titration method. Conclusions Result showed that the type of spaghetti and storage period was significantly ($P < 0.05$) affected the acidity of the cooking water. During the storage, increasing acidity of the cooking water.

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P516

DETERMINATION OF CONTAMINATION LEVELS OF LEAD (Pb) AND CADMIUM (Cd) IN WHEAT GROWN AROUND BEYŞEHIR - ISPARTA HIGHWAY

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In this study, the determination of contamination levels of lead (Pb) and cadmium (Cd) in durum wheat grown surrounding of the highway between Beyşehir and Isparta, characterized by a traffic density is 3915 vehicle in summer and 2304 in 2009 per 24 hours, was intended after super gasoline was banned in Turkey, 2006. For this purpose five distances from the highway edge (10, 20, 40, 60 and 80 m) were established where the wheat samples were taken and the concentrations of lead and cadmium were determined in the studied material by atomic absorption spectrometry. It was shown that differences in concentrations of lead and cadmium in wheat were statistically significant. When distance 10, 20, 40, 60 and 80 m from highway increased, lead concentrations were determined as 0.553, 0.512, 0.417, 0.328 and 0.256 mg/kg, respectively and cadmium concentrations were determined as 0.046, 0.040, 0.018, 0.013, 0.007 mg/kg, respectively. In addition, correlation between the lead and cadmium contamination and distance from highway is –0.938 and –0.918, respectively. Although the heavy metals concentration is considerably under risk value set by JECFA (Joint Expert Committee on Food Additive), wheat grown on the highway edge exposure heavy metal pollution.

Keywords: highway, lead, cadmium, wheat.

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P517

VARIETIES OF KATAIFI AND PRODUCTION PROCESSES

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Kataifi is one of the cereal-based traditional foods that lead to the production of various dough desserts with its different forms. When "kataifi" is pronounced, the first type that comes to mind is shredded kataifi. However, flat kataifi and bread kataifi, which have completely different production techniques and last product properties compared to shredded kataifi, create the varieties of kataifi together with the shredded type. These cereal-based semi-finished products are used for the production of some desserts taking important place among traditional Turkish dough desserts such as kunefe, burma kataifi, rolled kataifi, bread kataifi dessert, flat kataifi desserts and etc. In this study, the production techniques of shredded kataifi, flat kataifi and bread kataifi are individually presented and examined in details. The productions of these products in industrial size, the alternative ways applied in their supply to the market and the effects of these applied ways on product range are investigated. Today as the productions of our traditional desserts in industrial size gain importance, it is pointed out that the varieties of kataifi may be presented to the market as many kinds of products both as semi-finished and as last products.

Keywords: Kataifi, shredded kataifi, flat kataifi, bread kataifi, traditional Turkish desserts, dessert production, dough desserts

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P518

EFFECT OF OAT, RYE, CHICKPEA AND BUCKWHEAT FLOURS ON SELECTED PROPERTIES OF ERISTE, TURKISH NOODLE

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Erişte, egg noodle, is traditional cereal product which was produced from wheat flour, salt and egg. In different regions of Turkey, milk, whey powder and some additives can be added into erişte formulation for nutritional enrichment. In this study, wheat flour used in erişte production was replaced with oat, rye, chickpea and buckwheat flours at 40% (w/w) level. Whole egg, milk, vital gluten were used in erişte formulations. Some physical, chemical and sensorial properties of samples were determined. Ash and protein contents of the samples changed between 1.06-2.73% and 17.57-23.29%, respectively. While chickpea flour substitution gave the highest protein content, oat flour increased the ash content of the samples significantly ($p<0.05$). Erişte containing buckwheat flour showed the darkest color. Volume increase (VI) values of the samples varied between 100 and 187%, and chickpea flour substitution gave the nearest VI value to control erişte. Chickpea or buckwheat substitution increased the cooking loss significantly ($p<0.05$). Control and 50% buckwheat flour added erişte samples showed the highest overall acceptability scores.

Keywords: Erişte, noodle, oat, rye, chickpea, buckwheat

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P519

UTILIZATION OF CORN, TRITICALE, OAT AND RYE IN BULGUR PRODUCTION

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Bulgur is a valuable cereal product with its high nutritional value and long shelf life. Main bulgur production steps are cooking, drying and grinding. In this research, bulgur process was applied on different cereals, corn, triticale, oat and rye to produce bulgur-like products. Some physical properties of raw materials, bulgur yield, bulgur color (L, a and b), weight and volume increase values, moisture, ash, protein and cellulose contents of bulgurs were determined. Color intensity of raw materials directly affected bulgur color. While oat bulgur had the highest L value, rye bulgur gave the the darkest color. Pilav bulgur yield was found between 40 and 83% for different cereal bulgurs. Ash, protein and cellulose contents of the samples changed between 0.92-1.47 %, 9.79-13.06 % and 1.21-1.97%, respectively. Weight increase of the bulgurs varried between 83-112% and oat bulgur had the highest weight increase value. As a result of this study, the production of bulgur from different cereals was implemented, and corn and triticale was stand out with high pilav bulgur yields.

Keywords: Bulgur, corn, triticale, oat, rye, yield, color

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P520

EFFECTS OF ORGANIC AGRICULTURAL PRACTICES ON PHYSICAL AND TECHNOLOGICAL CHARACTERISTICS OF SOME BREAD WHEAT CULTIVARS

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The purpose of this study was to determine the effects of organic and traditional agricultural practices on physical and technological quality characteristics of some bread wheat cultivars (winter wheats; Gün-91, Altay-2000 and Sultan). The study was carried out as a field study during 2008-2009 growing season in ecological conditions of Isparta and set up as a randomized complete block design with a split-plot arrangement with three replications.
All of the bread wheat cultivars were damaged by sunn pest while the organic bread wheat cultivars were affected more and produced lower wheat yields than traditional wheat cultivars. In contrary, the organic wheat cultivars had higher values for all other evaluated physical characteristics and the moisture content in comparison to the traditionally grown wheat cultivars. However, the technological quality characteristics of the flours revealed that there was a limited difference between the organic and traditional wheat cultivars since some results were favorable for the organic agricultural techniques, some were favorable for the traditional techniques. Although sunn pest damage made it difficult to observe the potential differences between two growing techniques, it can be said that the organic agricultural practices improved all of the physical and some physicochemical characteristics of the bread wheat cultivars.

Keywords: Wheat, organic, traditional, physical, technological

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P522

THE EFFECTS OF ORGANIC AGRICULTURAL PRACTICES ON BREAD QUALITY

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The main objective of the study was to compare the effects of organic and traditional agricultural practices on quality of breads. Loaf volume, crust and crumb color and crumb grain properties of the breads were measured as quality parameters. Wheat flours were obtained by grinding winter bread wheat cultivars (Gün-91, Altay-2000 and Sultan) which were cultivated during 2008-2009 growing season in ecological conditions of Isparta. Organic agricultural practices lead to significant increase loaf volume of breads made with Gün-91, while it cause decrease at loaf volumes of breads made both Altay 2000 and Sultan wheat cultivars. Among all kind of breads highest loaf volume and better crumb grain quality was obtained from organic Gün 91 wheats, on the other hand the lowest loaf volume and crumb grain quality was detected at breads made with its traditional agricultural practices. Remarkable differences was not detected between the crust and crumb color of organic and traditional wheat breads since some results were favorable for the organic agricultural techniques, some were favorable for the traditional techniques. In addition effects of growing techniques on bread quality attributes could not be compared exactly, because of the sunn pest damage on three wheat cultivars especially wheats which produced with organic agricultural practices.

Keywords: Wheat, bread, organic, traditional

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P523

DETERMINATION OF WHEAT QUALITY PARAMETERS BASED ON NEAR INFRARED SPECTROSCOPY AND ARTIFICIAL NEURAL NETWORK

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In wheat and flour processing, the quality control needs quick analytical tools for predicting physical, rheological, and chemical properties. In routine technological quality assessment of wheat and flour, conventional methods are available. However, wet chemistry analyses take more time and/or requiring expensive equipment. NIR technology allows us to obtain results in a few seconds. The objective of this study was to utilize near infrared reflectance spectroscopy (NIR) to analysis of wheat and flour quality parameters such as protein content, zeleny sedimentation, water absorption, dough development time, dough stability time, degree of dough softening, tenacity, extensibility, P/G, strength, swelling index, and baking test (volume of bread and weight of bread (EKAG)) of whole wheat grown in different regions of Turkey were analyzed using near-infrared (NIR) transmittance spectroscopy. Feed-forward back propagation of ANN models was developed to select the optimal wavelengths. The ANN models were trained, tested, and validated using different groups of wheat in order to evaluate the robustness of the models. Prediction of protein, P, P/G, zeleny EKAG, and water absorption in particular gave a very good accuracy with R^2 of 0.952, 0.948, 0,933, 0.917, 0.801, and 0.792, respectively. The results indicate that NIRs can also use as a potential of the proposed techniques for predicting quality parameters.

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P525

EFFECT OF LACTIC FERMENTATION (LACTOBACILLUS PLANTARUM) ON INCREASE THE SHELF LIFE AND QUALITY PROPERTIES OF SEMI VOLUME BREAD (BAGUETTE)

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In this study, lactic fermentation was used in order to improve the quality of loaf bread (baguette). Lactobacillus plantarum was cultivated in a medium composed of wheat flour and water and added in bread dough formulation at 0, 5, 10 and 15% concentration. After baking, Staling, physicochemical (pH and acidity) and organoleptic properties (crust properties, taste and odor) were determined. Results showed that bread acidity increased as the concentration of sourdough in dough formulation increased. Acidity and pH of sample bread that contained 15% sourdough was 6.5 and 4.87 respectively. In addition, in this sample staling and quality changes during storage were at least. Highest score of taste were belonged to sample contained 5% sourdough. Sample contained 15% sourdough gained highest score of odor and crust properties. Finally, it seems optimum concentration for sourdough was 5% regarding taste of bread that was a critical characteristic. It was found use of sourdough would improve quality characteristics of semi volume bread.

Keywords: Baguette, sourdough, Lactobacillus plantarum, staling, organoleptic properties, life

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ROLE OF YEAST IN BREAD MIX ON ACRYLAMIDE FORMATION

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Due to the health hazard from acrylamide exposure from heat-treated foods the request of mitigation of this processing contaminant give rise to a challenge for food producers. Acrylamide in bread is formed predominantly in the crust during baking in correlation with brown pigments development. Presented study was focused on the bread prepared from the commercial bread mix using home bread maker. It was revealed that in this type of product the appropriate content of yeast in bread mix had been ascertained as a key factor on acrylamide formation. Selected levels of dried yeast addition in bread mix were tested (0.8%, 0.4% and control sample without yeast addition). Amino acids analysis proved out that yeast played important role during fermentation process in asparagine minimization which is the main precursor of acrylamide formation. Final content of acrylamide in bread was lowered from 247 μg/kg up to 18 μg/kg and 46 μg/kg by 0.8% and 0.4% of yeast addition, respectively. Moreover, the higher content of yeast ensured good shape of bread loaf and typical sensory properties of the product.

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IMAGE ANALYSIS OF BREAD STRUCTURE IN RELATION TO MECHANICAL PROPERTIES

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In order to correlate mechanical properties and crumb structure of bread, a simple and objective method for measuring the air-bubbles of samples was developed using an image scanner and digital image processing. The four images of the sample scanned in four orthogonal directions were aligned and combined to obtain the enhanced image in which air-bubble parts were emphasized by min operation (selecting the minimum gray level value among the four images for each pixel). Next, Otsu's method was applied to threshold each sub-image of the enhanced image in order to quantify the geometries of the air-bubbles precisely, and then the black parts of the image were recognized as air-bubbles. As a result, four air-bubble parameters of the bread samples were calculated as mean bubble area, mean bubble perimeter, number of bubbles, and bubble area ratio. In addition, viscoelastic properties of the samples were measured by creep test and confirmed to be significantly correlated with the bubble area ratio ($r > 0.59$, $p < 0.05$). This indicates that with increasing air-bubble area, crumb hardness increased. The proposed method is low-cost and easy to operate, thus considered to be applicable in an industrial scale.

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PREDICTION OF PROTEIN AND GLUTEN QUALITY-RELATED PARAMETERS OF WHEAT FLOUR USING NEAR-INFRARED REFLECTANCE SPECTROSCOPY (NIRS)

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Wet chemistry analyses are time consuming in wheat and flour processing technology for quality control. Near-infrared (NIR) spectroscopy as an alternative technology to conventional methods allows us to obtain results in a few seconds. In this study, NIR reflectance spectroscopy was used to development of calibration models of protein, wet and dry gluten contents and Zeleny sedimentation of flours grinding 120 varieties bread wheat collected from different regions of Turkey. Therefore, spectra in the range from 1100 to 2500 nm of the flours were acquired scanning by monochromator NIRSystems 6500. Multiple Linear Regression (MLR) and Partial Least Squares (PLS) regression were applied spectral data in log 1/R, first derivative and second derivative of log 1/R formats. Reasonably accurate models were attained for protein, wet and dry gluten contents and Zeleny sedimentation with r = 0.985, 0.976, 0.953 and 0.924 respectively.

Keywords: NIR, protein, gluten, Zeleny sedimentation.

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TEXTURAL PROPERTIES OF REBAKED CAKES AFTER PART-BAKED AND STORED AT ROOM TEMPERATURE

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The effects of par-baking and storage time on the textural properties (firmness, cohesiveness, springiness, gumminess and chewiness) of cup cake were investigated. Firstly, cakes were par-baked at 175 °C for 15, 20 and 25 min. After cooling to room temperature, cakes were packed in double-folded polyethylene pouches and stored at room temperature for 3, 6 and 9 months. At the end of storage period, cakes par-baked for 15, 20 and 25 min were rebaked at 175 °C for 20, 15 and 10 min, respectively. Textural properties of cakes were evaluated by using a texture analyzer after one hour from the second baking. It was observed that textural properties of cup cakes were significantly affected by both par-baking and intermediate storage time. In general, the increase in the time of storage of part-baked cake resulted in an increase in the firmness, springiness, gumminess and chewiness values of rebaked cakes. Regarding the firmness, cohesiveness, springiness, gumminess and chewiness, the results indicated that the best result was generally obtained when cakes were baked for 20 min at the par-baking stage.

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INSIGHT INTO THE VARIABILITY OF ENDOXYLANASE INHIBITOR ACTIVITIES IN ALGERIAN SORGHUM (*S. BICOLOR* (L.) MOENCH) AND PEARL MILLET (*P. GLAUCUM* (L.) *R. BR*) CULTIVARS

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Three types of structurally different proteinaceous xylanase inhibitors with different enzyme specificities have been successfully purified from cereals, identified and characterized, i.e. the TAXI type, the XIP type and the TLXI type inhibitors. Variable levels of endogenous xylanase inhibiting activities have been determined in different varieties of wheat, barley and rye, but, to our knowledge, no corresponding reports on the topic are available for sorghum and pearl millet. The aim of this research, was first to gain insight in the presence of proteinaceous xylanase inhibitors and the variability of inhibitor levels in different cultivars of Algerian sorghum and pearl millet. The present study provides for the first time proof for the existence of xylanase inhibition activity in sorghum and pearl millet. A significant part of the inhibition activity was inactivated by boiling and may be the results of heat labile proteins like XIP type xylanase inhibitors. No indications were found for the presence of TAXI type xylanase inhibitors in sorghum and pearl millet. The polyphenols/tannins present in these cereals did not have a significant effect on the activity of the GH family 10 P. purpurogenum xylanase and, hence, were not at the basis of the inhibition activity bearing heat-treatment.

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INNOVATIVE TECHNOLOGY OF FLOUR ENRICHMENT

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Research objective is to work out scientifically - practical bases of flour quality improvement for manufacture bakery, flour, and pastry in assortment. Types of flour grades are made on the basis of mathematical modeling formation of flour streams with use information technologies in production conditions, taking into account such parameters as granulometric structure, the content of protein, gluten and as level. Analytical devices atomic adsorption spectrometer, system capillary cataphoresis and highly effective liquid chromatograph Agilent 1200 were used to perform. Physical and chemical analyses of flour quality were tested in the accredited test laboratory of food safety of Almaty technological university. Microbiological analysis of flour quality of a special-purpose designation was carried out. Vitamins, biological, mineral value of flour enriched by food additives are defined and indicators of safety of flour are analyzed. Technological and baking properties of flour are investigated. The technology of flour enrichment is developed.

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AN INVESTIGATION AND COMPARISION OF THE EFFECTS OF ADDING ORGANIC ACIDS AND SOURDOUGH ON RHEOLOGICAL PROPERTIES OF BARBARI BREAD DOUGH

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In this research Impacts of artificial acidifiers (Lactic acid, Acetic Acid , Citric acid) with three levels (0%, 0.25 % , 0.5 %) on rheological properties of Iranian Barbari Bread dough was conducted by a completely randomized design with factorial arrangement and two replications. At the next stage an orthogonal comparison between selected acidified treats (having control sample) with sourdough group was made. Rheological study revealed addition of 0.25% acetic acid and gradual addition of lactic acid reduced the dough extensibility, while adding citric acid was in contrast. Addition of 0.5% citric Acid resulted the significant increase in dough extensibility. On oppropriate mixing condition, chemical acidified doughs showed more elastic properties. Addition of 0.25% citric acid resulted in increase of dough toughness, spectacularly. Addition of 0.25% Lactic acid led to the least dough extensibility. Addition of acetic acid led to reductin of hardness tough. The comparison of selected final treats (selected acidified treats, control treat and 2 kind of sourdough treats, 3 & 4 hour fermentation) showed the treat containing 0.25 % lactic & 0.25% citric acid, had the least dough extensibility. Two sourdough treats, 4hours fermentation & 3hours fermentation, had the most dough extensibility, sequencely. Orthogonal comparison among these six treats indicated that these 2 groups had significant statistical difference. In addition, four selected acidified treats showed the least doght toughness, between two final groups.

Keywords: Barbari Bread , Organic Acids, Sourdough, Rheological properties

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EFFECTS OF DIFFERENT HYDROCOLLOIDS ON QUALITY PARAMETERS AND STALING OF GLUTEN-FREE BREAD

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Celiac disease (CD) is an autoimmune enteropathy induced by gluten proteins present in wheat, barley, rye and oat. The only effective treatment for CD is a gluten-free diet. Gluten-free breads require polymeric substances that mimic the viscoelastic properties of gluten to provide structure and retain gas. Gums and hydrocolloids appear to improve gas retention and water absorbing characteristics usually supplied by wheat gluten. The aim of the present study was to use a range of hydrocolloids including pectin, guar and κ-carrageenan in three levels of 1, 2 and 3% and combinations of them in two levels of 2 and 3% into gluten-free formulations based on wheat starch and sodium caseinate and examine their effects on quality parameters (volume, specific volume, height, sensory evaluation, crumb hardness and staling) of the baked end-product. The type and extent of influence on bread quality was also dependent on the specific hydrocolloid used and its supplementation level. Significant increase was observed in bread volume by addition of hydrocolloids than starch control bread (without hydrocolloid) except κ-carrageenan. Combination of guar-pectin in 3% concentration in gluten free bread showed high volume, height, sensory properties and shelf life compared with other treatments.

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DETERMINATION OF DOUGH STICKINESS VALUE OF DIFFERENT FLOUR COMBINATIONS

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Through the process of baking, dough stickiness is important and a widespread problem and that is influenced by many factors. Reliable, quick and quantitative methods are needed for measurement of dough stickiness in the baking industry. In this study, three different flours were used (F_1, F_2 and F_3) and 12% wheat starch or 2% vital gluten were added to those flours to widen protein content for each flour sample. Later, stickiness values of prepared doughs were measured using SMS/Chen-Hoseney unit at different times (0, 20 and 40 min). Stickiness value (g), work of adhesion (g.s) and the distance the sample is extended on probe return (mm) (dough strength/ cohesiveness) measurements were used for comparison. Obtained data from dough with F_1 was significantly different from other flours ($P<0.05$). Increased protein content and relax time have changed dough stickiness value. Between farinograph water absorption and dough stickiness of flour used in the study a positive relationship was found. Higher water uptake of flour increased dough stickiness.

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WATER AND POROSITY OF GRAIN AS FACTORS OF STORAGE AND FOOD SAFETY

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The sizes of molecules of water, the active centres of biopolymers and nutrients of foodstuff can be in limits from 0.1 nanometers to 10 nanometers. The sizes of a microporosity of grain, microflora (yeast, bacteria, mushrooms) can be within 500 nanometers to 10 000 nanometers. From 1 000 000 nanometers to 32 000 000 nanometers and above is it the sizes of insects of grain and a foodstuff. Activization of physiological processes in grain, it is caused by that that protein of the active centres of macromolecules more of the sizes of water and can keep a significant amount of molecules of water. The microstructure of biopolymers and a moisture influence technological properties of processed raw materials, on duration of safe storage of production and on energy expenses at processing. At interaction with materials of raw materials and foodstuff free water as a result of interaction with the active centres of macromolecules of biopolymers passes in the connected condition. Thus there is a phase transition of one kind, which leads to change of physical and chemical properties of water that it is necessary to consider by working out of technological operations, at the power consumption account on technological processes. Thus, thermal processes make active biological system of grain and occupying its surface of microflora. The given processes essentially influence physical, chemical and biochemical properties of grain, food safety and favorable conditions for development in them various fungoid representatives, including producing various toxins are created. Researches have shown; Possibility of the forecast of a temperature mode and of humidity parameters of stored grain; Temperature levels and points changes of physiological activity of grain at storage. Found laws of formation of porous structure of grain in storehouses, the analysis of physical and chemical processes on border of section of phases of heterogeneous system grain-damp air of intergrain spaces were theoretical base of the new approach to increase of food safety of grain and reduction energy consumption at the enterprises.

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DETERMINATION OF RHEOLOGICAL PROPERTIES OF FLOUR USING TEXTURE ANALYZER AND COMPARATION OF RESULTS WITH EXTENSOGRAPH VALUES

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Rheological properties of wheat flour dough change through the baking process and ultimately the quality of the products alters. Dough extensibility and resistance to extension widely used to determine bread flour quality and the effects of ingredients and additives. In this study, three different flours were used (F_1, F_2 and F_3) and 12% wheat starch or 2% vital gluten were added to those flours to widen protein content for each flour sample. Extensibility values of prepared doughs were determined at different times (45, 90 and 135 min), with extensograph and SMS/Kieffer dough-gluten extensibility ring unit using of Texture Analyzer. Average extensibility values obtained with both methods showed the same trend ($F_2 > F_1 > F_3$). For three different flour, the difference between the values of extensibility obtained with Texture Analyzer was insignificant, while the difference between ekstensograph extensibility values were significant ($P<0.05$). Extensibility with extended rest time decreased in both methods. The difference between resistance value of prepared dough with different flour combinations was found significant in both methods and the resistance value of F_2 flour is different from other flours ($P<0.05$). Considering all flour combination, results obtained from Texture Analyzer showed better relationship with increased protein content.

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EFFECT OF GUAR GUM AND CARBOXY METHYL CELLULOSE (CMC) ON QUALITY AND SHELF LIFE OF BARBARY BREAD

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Barbary bread is very popular in Iran. To improve final quality and extend shelf life of Barbary bread, two different hydrocolloids, carboxy methyl cellulose (CMC) and guar gum (in 3 levels 0.5, 1, 1.5%) were added to bakery flour with 82% extraction. The rheological behavior of dough was performed using farinograph and extensograph. Rheological characteristics of bread dough were modified by hydrocolloids. Bread staling was determined after 0, 3, 6 days of storage by panel test. Sensory evaluation by panel group showed that hydrocolloids delayed the bread staling specially by 1.5% guar gum. Also the best shelf life for Barbary bread is 3 days after production.

Keywords: Barbary bread, shelf life, guar gum, CMC, rheological behavior, sensory evaluation

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INNOVATIVE CONTROLLED SUDDEN PRESSURE RELEASE TECHNIQUE FOR PROCESSING OF CEREALS AND LEGUMES

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Abstract: Rapid changing today's nutrient habits necessitate using new technologies during processing of cereals and legumes which are the main agricultural products in Turkey. In recent years, researches especially on the proses which oriented towards the innovative food products are rapidly expanding around world. The most recent process is the controlled sudden pressure release process (Détente Instantanée Contrôlée; DIC). This technique is based on a hydro–thermo-mechanical effect induced by the abrupt transition from a high steam pressure level to a vacuum. DIC treatment consists of placing the low moistened product in a processing chamber and exposing it to a steam pressure at high temperature over a relatively short time, followed by a rapid expansion to a vacuum pressure. This pressure drop generates porous texture of food by self-vaporization of a part of the product water. DIC process appeared to be an advantageous and potential method for use in the processing of food raw materials, especially cereals and legumes, due to relatively low production costs, preparing wide variety of products, evaluation of whole raw materials, a rapid, controlled production technique and forming desirable textural properties in the processed material comparing to the known traditional food processing methods.

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UNIVERSAL SYSTEM OF SEED TREATMENT

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Universal System of Seed Treatment Kazakhstan is one of the leading countries in the world in the production of the seed and treatment of its products. So that the problems of seed treatment undoubtedly actual as for producers of seeds also for treatment branch of the country. Foreign grain that has come for treating contains impurity, which is differing from basic cereals with its size, form, aerodynamic properties, density, surface condition and other properties. Obtaining grain cleaners operating on the only one above-named characters of the difference component foreign grain usage. Also, applying in the machinery industry with respect to engineering efficiency and energy content are not responding to the ascending requirements of the modern seed treatment branch or the Republic. Facilities for the cleaning seed culture shall be satisfied by requirement articles, such as: to provide high efficiency of technological process, has low costs, energy content and simple construction. Separators for the seed cleaning shall be universal, able to work as native mode, and also technological chain set and complexes. Almaty Technological University scientists were elaborated universal separating system of the seed and treated products that allow achieving high technological and energetic rate of the seed separation that not concedes the best rates of the world analog.

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INVESTING THE MECHANICAL AND THERMOMECHANICAL PROPERTIES OF LOW DENSITY POLYETHYLENE (LDPE)/ STARCH COMPOSITE FILMS

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Biodegradable plastics packaging have been studied in recent year. Usually two type of biodegradable polymers useing for food packaging products: natural biodegradable polymers and/or composites from synthesis and natural polymers. In this research work composites of low density polyethylene and corn starch in three levels (80/20, 70/30 and 60/40 w/w%) in present of glycerol (30% wt of starch) as plasticizer and polyethylene/maleic anhydride (PE-MA) as a coupling agent were studied. The processing were carried out in Brabender twin screw extruder with the following profile zones: 130, 140, 150, 120 °C and speed of 65rpm) using sheet die. The prepared samples were dried in an oven over night at 75°C. The mechanical and thermomechanical properties of the composite samples were studied. The results showed that the tensile strengths for 100/0, 80/20, 70/30 and 60/40 w/w% LDPE/Starch samples were: 13.9, 7.8, 12.1 and 8.9 MPa and the elongation at peak were: 268.323, 232.103, 387.351 and 373.560 mm respectively. In comparsion LDPE/Starch compositions it was found that the 70/30 w/w% ratio had good tensile strength and elongation at break value in comparison with pure LDPE and other levels. The rate of biodegradation was also evaluated for all composites films. Blending starch with polyethylene was planned with aim of making LDPE partially biodegradable. The ratio of biodegradation of LDPE/ starch depended upon starch content.

Keywords: low density polyethylene, starch, biodegradable, mechanical properties, thermo mechanical properties.

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USING LMP AS A PRETREATMENT BEFORE OSMOTIC DEHYDRATION PROCESS ON WHITE BUTTON MUSHROOM (*AGARICUS BISPORUS*)

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In spite of many advantages cited for osmotic dehydration in order to extension of shelf life many products such as edible mushroom, the water of food material is removed through the semi permeable cellular membrane and solute is transferred into the food. As a result main taste and structure of product will change. In order to prevention of these changes and improving physical properties, in this study effects of Low Methoxy Pectin (1.5 % (w/v)) and osmotic dehydration process on mushroom were surveyed. The samples were immersed in osmotic solutions (10% salt, 10% salt + 5% sugar, 15% salt + 5% sugar and 15% salt + 10 %sugar) at selected time (40, 60 and 80 min). The result showed that the effect of LMP coating on improving rehydration ratio wasn't significant. Nevertheless among different concentrations of osmotic solution using 10% salt and 5% sugar was more effective on rehydration ratio. However, the effect of LMP coating on water loss wasn't significant; the amount of solid gain in coated samples was higher than control. Moreover, the amount of water loss and solid gain increased with time and concentration of osmotic solution ($p<0.01$).

Keywords: button mushroom, *Agaricus bisporus*, osmotic dehydration, LMP

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EXTENDED SUSTAINABILITY OF PACKAGED FOOD PRODUCTS USING MODIFIED ATMOSPHERE

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Contemporary technological developments involving the use of modified atmosphere make it possible to preserve and prolong the nutritive quality of food products produced by different technological procedures. In this paper, the changes in quality of dried apricot, packed under modified atmosphere (30% CO_2, 60% N_2) in selected packaging materials, were examined. The paper provides the results of analyzing quality of packaging materials, production and hermetic quality of food products' packaging, as well as the stability of applied modified atmosphere. Over the 9 months storage period, changes in water content and total phenolics of the packaged product were monitored. The modified atmosphere in packaging had changed depending on the type of the combination, as well as the permeability of the packaging materials to O_2, CO_2 and N_2 molecules. The results implied that the used packaging materials can prevent the quality stability of dried apricot, and could alleviate the consequences and contribute to longer shelf-life of the product. Depending on the barrier characteristics of packaging materials, an adequately prepared combination of modified atmosphere allows the controlled permeability of gasses, thus providing optimal protection and long-term viability of packaged products.

Keywords: packaging, packing, quality stability, protective atmosphere.

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DETERMINATION OF SHELF LIFE AT +4 ° C AND MARINATE PROCESSING FROM FROZEN ANCHOVY (Engraulis engrasicholus L., 1758)

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The aim of this study was to determine the sensorial, chemical and microbiological changes of marinated anchovy (*Engraulis engrasicholus* L., 1758) stored at 4 °C±0.5. Marinates was made from anchovy bloks (10 kg) which shocked at -40 ° C and stored at -20 °C. After defrost fish were headed, gutted, filleted and immersed into marination solutions which sell in markets are ready to make. Solutions were seperated into 2 groups that were vinegar (V) and lemon (L) juice. The beginning of the study at raw anchovies TVB-N, TBA and pH results were found 11.24±0.2 mg/100g, 0.58±0.3 mg MDA/g, 6.52 respectively. First month after stored, TVB-N, TBA and pH results for L group were 10.92 ± 0.2, mg / N 100g, 5,08±0.2, mg MDA / g, 4.42±0.2, for V group 7.56±0.1 mg/ N 100g, 4,63±0.3 mg MDA/g, 4.26±0.2 declining respectively. Microbiological analysis for the end of first month total mesophilic bacteria count for L and V groups were 3.07 log / cfu, 2.95 log / cfu, respectively. Yeast and mold count for L and V were 1.23 log / cfu, 1.07 log/cfu respectively and psychrophilic bacteria count and coliform bacteria has not been found. Second month after stored TVB-N, TBA and pH results for L group were 20.49±1.5 mg / N 100g, 6.41±0.08 mg MDA / g, 4.47±0.1, for V group 17.83±0.78, 5.98±0.1 mg MDA / g, 4.77±0.05 determined, respectively. Microbiological analysis for the end of second month total mesophilic bacteria count in L and V groups were found 2.39 log/cfu, 4.11 log/cfu respectively. Yeast and mold count in L and V groups 2.39 log/cfu, 1.77 log/cfu were found respectively. Psychrophilic bacteria count for L and V groups were 1.4 log/cfu, 1,3 log/cfu, respectively. Coliform bacteria count in L and V groups were found 1,3 log/cfu, 1.17 log/cfu respectively. Third month after stored TVB-N, TBA and pH results for L group were, 23.8±0.92 mg/ N 100 g, 6.9±0.3 MDA/gr, 4.5±0.2, for V group 20.68±0.5 mg/ N 100 g, 6.5±0.25 MDA/ gr, 4.45±0.1 found respectively. Microbiological analysis for the end of third month total mesophilic bacteria count in L and V groups were found 3.71 log/ cfu, 4.23 log/cfu, yeast and mold count in L and V groups were found 3.79 log/ cfu, were 3.95 log/cfu, psychrophilic bacteria count for L and V groups were found 1.6 log/cfu, 1.4 log/cfu, coliform bacteria count in L and V groups were found 1.44 log/cfu, 1.47 log/cfu respectively. According to the results of sensory analysis for 3 months in the product not identified any negative parameters, the two groups have been consumed with admiration.

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STUDY WATER VAPOR BARRIER AND MECHANICAL PROPERTIES OF COMPOSITE FILMS BASED ON CHITOSAN AND ZEIN FOR BIODEGRADABLE FOOD PACKAGING

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Packaging is the science, art and technology of enclosing or protecting products for distribution, storage, sale, and use. Biodegradable flexible films obtained from chitosan (CH) and zein (Z) can reduced environmental problems associated with synthetic packaging. Zein is the most important protein in corn. Zein has good film forming properties. chitosan (ch), can be readily obtained from chitin with different degrees of deacetylation after reaction with alkali. Chitosan has been well known for its excellent film forming property. Films of chitosan and zein were prepared by casting method. Their mechanical and barrier properties of these composit films plasticized with glycerol (gly) and poly ethylene glycol(peg) were evaluated. Chitosan and zein blend films were smooth, homogeneous and compact film structure . The result showed that water vapour transmition values of composit films ranged between 12,805 g/m2*7day and 16,188 g/m2*7day, lower than those of single component films. Tensile strength values of zein-chitosan films were higher than pure zein and chitosan films.Composit biodegradable films showed higher elongation at break values than those of single component films. In conclusion, zein-chitosan films can be described as bio films with interesting water barrier and mechanical properties for use in food oating or packaging.

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P557

EVALUATING SOME OF POLYSACCHARIDE EDIBLE FILMS PROPERTIES AND ITS EFFECTS ON THE SHELF-LIFE OF BAGUETTE BREAD

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In this study, composite edible films of starch, hydroxypropylmethylcellulose (HPMC), methylcellulose (MC) and sunflower oil was prepared. The effect of potassium sorbate (PS) varying concentrations (2%, 6%, 10%, 14% & 18% w/w of dry matter) and film thickness (15, 30 and 60μm) on water vapor permeability (WVP), tensile strength (TS) and percentage elongation at break (E%) were studied. In addition, the effect of relative humidity (52, 57 & 75%) on WVP of films was determined. We also investigated the ability of applied coating to retard baguette bread staling by evaluating mechanical and organoleptic properties. The PS increased WVP only in high concentrations significantly. With increasing of PS concentration, E% increased but TS of film significantly decreased. In addition, with the increase of thickness, rose the WVP, E% and TS. Moreover, relative humidity influenced WVP of films. Mechanical and organoleptic tests of bread clearly indicate that applied coating was successful in delaying staling of baguette bread.

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P558

A RESEARCH ON THE POST HARVEST QUALITY OF 5 DIFFERENT WASHINGTON ORANGE TYPES

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During this research, the post harvest quality of 5 different washington orange types was investigated. The study was carried out in the pomology laboratory and storage rooms of Batı Akdeniz Agricultural Research Institute in 2008. M9, M27, M32, M36 and M86 Washington orange types present in the "Citrus Variety Selection and Variety Development Project" were used. Washington orange types were kept for 21 days under 20°C±1 and at %55-60 relative humidity and calculations and pomological analysis were conducted. During the trial, % weight loss, fruit juice amount (g citric acid/100 ml fruit juice), total soluble solid amount (%), titratable acid amount (%), total soluble solids/titratable acidity ratio and change in rind thickness (mm) were examined analysis conducted with 7 day intervals and three repetitions.

Keywords: Citrus, post harvest quality, storage

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P559

THE EFFECTS OF POST-HARVEST PROPOLIS APPLICATION ON POST HARVEST QUALITY OF VALENCIA ORANGE TYPES

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During this research, effects of post-harvest propolis application were investigated on different Valencia orange types. The study was carried out in the pomology laboratory and storage rooms of Batı Akdeniz Agricultural Research Institute in 2009. VAA 77 and VAA 88 Valencia orange types present in the "Citrus variety selection and variety development project" were used. Fruits were dipped in ethanol-extracted propolis (%3 concentration) immediately after harvest. The control group was left untreated during the trials. Valencia orange types were kept for 21 days under 20 °C±1 and at %55-60 relative humidity and calculations and pomological analysis were conducted. During the trial, % weight loss, fruit juice amount (g citric acid/100 ml fruit juice), total soluble solid amount (%), titratable acid amount (%), total soluble solids/titratable acidity ratio and change in rind thickness (mm) were examined analysis conducted with 7 day intervals and three repetitions.

Keywords: Citrus, post harvest quality, storage, propolis

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P561

IRRADIATION TECNOLOGY IN SEA PRODUCTS

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Food irradiation reduced the number of microorganisms in foods, to destroy pathogens and to extend the shelf life of foods in order to be exposed to ionizing energy process. Food preservation techniques within the irradiation technology, as well as in other food products stored sea products are also of great importance. Worldwide increasing demand for sea products has increased the need for effective protection method. Radiation pasteurization of the sea products quality and shelf life; product quality is the start of the microbial flora of the qualitative-quantitative composition, packaging, dose received, block users microbial presence or absence of seafood and biochemical structure of many factors, depending on varies. Irradiation of seafood threatening diseases caused due to bacteria and other harmful microorganisms that cause spoilage organisms are largely eliminated. However, sea products can be irradiation fresh or processed. The purpose of this review of sea products processing technologies in the traditional method compared to the many advantages that irradiation of using technology dissemination to contribute, their benefits at the highest level to take advantage and relevant to more comprehensive research is needed to emphasize.

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P562

ANTIMICROBIAL PACKAGINGS AND THE IMPORTANCE FOR FISH AND FISH PRODUCTS

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Food packaging applications is very important to extend the shelf of products. Especially for providing food safety, limiting oxidation problems, delaying enzymatic and bacterial degradation, different packaging techniques are used. But these packaging materials are made of plastics which are toxic for humans and environment. Especially in recent years, antimicrobial packaging materials have been developed and the extension of shelf life of ready to eat foods, food quality, and increased reliability is provided. Inorganic antimicrobial agents in terms of human health do not show negative effects. On the surface of food packaging materials containing antimicrobial substances are composed of an effective method for preventing microbial spoilage. Antimicrobial packaging is one of the newest methods for protecting sensitive foods especially for fish and fish products against microbiological degradation. In lights of above this study is a review of different types of antimicrobial packaging, the importance of these packaging for fish and fish products and also comparison with other foods.

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P563

THE QUALITY CHANGES OF VACUUM PACKAGED FRIED SARDINES AND MUSSELS STORED AT -18 °C

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The quality changes of vacuum packaged fried sardines (*Sardina pilchardus*, Walbaum 1792) and mussels (*Mytilus galloprovincialis*, Lamarck 1819) stored at -18 °C were determined. For this purpose microbiological, sensory and chemical analysis were done for determining the shelf life of the fish products. The analyses were done during the storage period of 1., 3., 5., 7. months. In this study, fresh sardines and mussels were cleaned and washed. Then covered with the flour and then fried by using house-type pan at 180 ° C for 4-5 min. After cooling for 5 min. at room temperature, fish products were placed in polyethylene bags and vacuum packaged, then stored at -18 ° C for 7 months. After the 3. months of storage, TVB-N value of vacuum-packaged fried sardines and mussels were determined as 20.65 mg/100g, 21.01 mg/100g, respectively. TBA values were found to be 11.10 mg malonaldehyde/kg, 3.86 mg malonaldehyde/kg for vacuum-packaged fried sardines and mussels respectively. The total mesophilic, total psikrotrophic, anaerobic bacteria counts, were determined as 6.25 $x10^2$ cfu/g, 6.65 $x10^2$ cfu/g, 7.15 $x10^2$ cfu/g for sardines; 3.15 $x10^2$ cfu/g, 2.5 $x10^2$ cfu/g, 3.75 $x10^2$ cfu/g for mussels. *E. coli* and yeast- mold were not detected during the storage period.

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P564

THE EFFECT OF MODIFIED ATMOSPHERE PACKAGING WITH OXYGEN SCAVENGER ON QUALITY CHANGES IN CHICKEN BREAST MEAT PATTIES DURING REFRIGERATED STORAGE

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Utilization of oxygen scavengers in food packaging has gained great importance as a class of active packaging systems. This study focused on effects of active MA packaging (MAP, 70% CO_2/30%N_2) containing an individual iron- based oxygen scavenger sachet (OS) on quality of chicken breast meat patties. Microbiological, physical and chemical changes in chicken breast meat patties (CBMP) were evaluated during refrigerated storage (4°C) for 13 days. CBMPs were separated into four groups, packaged in air (A), air+OS (AOS), MAP, or MAP+OS (MAPOS), and analyzed at Day 0 and two-day intervals thereafter for pH, total aerobic mesophilic (TAMB) and psychrophilic bacteria (TAPB) counts, thiobarbituric acid (TBA) value, and CIE L* (lightness), a* (redness) and b* (yellowness) color values. Higher pH values ($p<0.05$) were determined in group A than the other groups due to greater microbial growth. TAMB and TAPB counts were reduced as a result of OS utilization with a greater effect when used in combination with MAP. TMAB exceeded the acceptability limit at Day 5 in A group, Day 9 in AOS group, and Day 13 in MAP and MAPOS groups. Lower TBA values were observed in OS incorporated groups ($p<0.05$) indicating that OS could inhibit lipid oxidation. OS with or without MAP resulted in higher a* values over the refrigerated storage ($p<0.05$).

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P565

INVESTIGATION OF RETAIL STORAGE POSSIBILITIES OF PEELED, BOILED EGGS

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Our purpose was to investigate the change of organoleptic and microbiological features of peeled, boiled eggs packed differently in retail quantities at 4 °C. Fresh eggs obtained from a layer plant were boiled for 10 minutes at 95 °C in a thermostat and then cooled down to 12 °C in 4 °C water. Subsequently the samples were packed by using vacuum packing containing filling liquid or inert gas in a pack size containing 3 eggs. Our result have shown that the vacuum-packed eggs have short shelf-life as well as they rapidly loose the organoleptic features characteristic to fresh boiled egg. The organoleptic features of samples stored in acidified salt solution or in inert gas were more beneficial. The taste and colour of eggs stored in N2-CO2 gas mixture were better, but the shelf-life was significantly shorter regarding the food safety and quality criteria. During our experiments the total germ count was roughly the same in the peeled boiled whole eggs in citric acid-salt water. Our studies have shown that the use of boiled eggs packed in inert is recommended for users where the natural colour of egg is important but where boiled eggs are subject to further processing or stored for longer period salt solution is more suitable.

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P566

EFFECT OF MODIFIED ATMOSPHERE PACKAGING ON MICROBIOLOGICAL CHANGES OF SEAFOOD

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Seafood are highly perishable products because of their biological composition. Microbial spoilage is a major cause of economic loss to the seafood industry. Modified atmosphere packaging (MAP) extends shelf-life of most fishery products. Extension of shelf-life depends on species, fat content, initial microbial population, gas mixture, the ratio of gas volume to product volume, and most importantly, storage temperature. The shelf-life of fishery products is usually limited by microbial activity, although for some fatty fishes or at superchilled storage, it can be limited by nonmicrobial activity. These factors individual or related eachother results in changes in colour, flavour and odour, and leads to an overall deterioration in food quality. So usage of packaging technics together with chilled storage leads to foods more stable than the others and its importance increases day by day. The aim of this study was to investigate the effect of modified atmosphere packaging (MAP) on microbiological and chemical changes of seafood.

Keywords: Seafood, modified atmosphere packaging, MAP, oxidative reaction, microbiological changes

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P567

EFFECTS OF EDIBLE ZEIN AND CHITOSAN COATING ASSIMILATED BY OREGANO ESSENTIAL OIL ON QUALITY INDEX OF EGG

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Undesirable changes including exchange of carbon dioxide and humidity through the shell-pores and cracks, take place immediately following the lying of egg. C, were investigated. The results suggested significant differences between all treatments and controls (P°One of the main strategy to control these defects is coating the egg-shell by oil and polymer materials. In the present study, chitosan (2%) and zein (10%) biopolymers alone and in combination with oregano-essential oil (EO) on internal changes such as percentage of weight loss, pH, Haugh unit, Yolk index and egg quality, and sensory factors including surface smoothness, odor, surface glossiness and overall acceptability, of eggs stored for 5 weeks at 25 < 0.05). Incorporation of EO to the chitosan and zein coating solutions had significant effects on internal factors of all treatments during the storage period ($P < 0.05$). In the sensory evaluation of eggs coated with chitosan and EO showed significant differences with chitosan solution alone whereas, such differences could not be observed for zein and zein plus EO samples. Therefore, coating with both biopolymers had considerable impact on internal quality of eggs whereby, extended shelf-life of eggs to 2-4 magnitudes at room temperature. Moreover, when EO added to the coating solution, enhanced consumer acceptability of all coated eggs was observed.

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P568

A COMPARISON BETWEEN CONSUMER ACCEPTABILITY OF CARBONATED BEVERAGES: FERMENTED MILK (DAIRY AND SOY) BEVERAGES VS. SOFT DRINK

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Older children enjoy more freedom in making food choices, and their diets appear to worsen with age. In particular, 60 percent of preschool children meet their calcium intake recommendation, but only 13 percent of teenage girls meet the recommendation. Consuming enough calcium during childhood and adolescence is important to bone formation and to prevention of osteoporosis in later life. In present study 5 different carbonated beverages including soft drink (cola), fermented milk and soy-milk simple and flavoured) beverages were prepared and tested by children (in school) and ordinary people (in fast food shops) regarding to age and sex. Results showed that among beverages, cola had higher acceptability than dairy beverages but the differences were not significant. Among dairy beverages, flavoured samples preferred slightly more than simple beverages. Furthermore, fermented milk beverages (both flavoured and simple) had higher acceptability than soy-milk samples.

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P570

CHARACTERIZATION AND QUANTIFICATION OF PHENOLIC AND OTHER POLAR COMPOUNDS BY HPLC-ESI-TOF-MS IN SOLID WASTE GENERATED DURING THE STORAGE OF EXTRA VIRGIN OLIVE OIL

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The aim of this work was to identify and quantify phenolic and other polar compounds in solid waste generated during the storage of extra virgin olive oil (EVOO). Olives from Hojiblanca variety were processed by a continuous industrial mill equipped with a hammer crusher, a horizontal malaxator, and a two-phase decanter. Olive oil was stored in a tank without headspace at room temperature and in darkness for nine months. A comparative study of various procedures with different conditions was performed to extract the phenolic compounds from the solid waste. A high-performance liquid chromatography coupled to electrospray ionization time-of-flight mass spectrometry (HPLC-ESI-TOF-MS) method was used for qualitative and quantitative characterization of polar compounds in solid waste generated during the storage. The chromatographic method consisted in a multi-step linear gradient using water with 0. 25 % acetic acid as eluent A and methanol as eluent B. Finally, compounds belonging to different families (simple phenols, flavonoids, lignans and secoiridoids) were identified and quantified. All of them, hydroxytyrosol (HYTY), tyrosol (TY), decarboxymethyl oleuropein aglycon (DOA), luteolin (Lut) and apigenin (Apig) were the most abundant compounds. Therefore, the solid waste generated during the storage is an alternative source of these phenolic compounds.

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P575

EFFECT OF PACKAGING ON PRESERVATION TIME AND PHYSICOCHEMICAL CHARACTERISTICS OF TWO KIWI FRUIT CULTIVARS (HAYWARD AND ABBOT) DURING COLD STORAGE

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Two cultivars of kiwi fruit, Hayward and Abbot, were harvested. Fruits were graded and packed in wooden boxes, cartons and low density polyethylene (LDPE) films, then were cold stored (T=-0.5 - + 0.5 & RH=90-95%) for a period of 6 months and samples were taken random for intervals of 30 days. Chemical and physical characteristics were measured. Statistical analysis was performed with factorial experiment in unequal completely randomized and average comparison design by multiple range test. The results showed that, Abbot cultivar has shorter storage time, 4 months, compared to Hayward with 6months storage period. Hayward contained more dry matter than Abbot throughout the storage period. Total soluble solids of cultivars increased and Titrable acidity as citric acid decreased during storage. Vitamin C of Abbot was more than Hayward throughout the storage. Total factors in relation to texture and physical properties decreased by passing time such texture Hayward cv. after six month storage and in Abbot after four month storage was softer. As final conclusion, wooden bins packaging for longer storage and plastic packaging for monotonous ripening of kiwi fruit was the best in compared with other packaging.

Keywords: Abbot, Hayward, packaging, storage

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P576

EVALUATION OF RHEOLOGICAL PROPERTIES OF THE BASED COLLAGEN EDIBLE FILM

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Today's chemical pollution in nature that result from polymers, plastics and synthetic packaging material is one of the most important danger that threat mankind's life, so that researchers always struggle until they found a way for solving this basic problem. Thus in recent years, they tried to make edible films and degradable coatings from biological material and natural polymers that could contribute to solving chemical pollution and creating new markets for agricultural products. The based collagen film is one of the edible films which could be utilized for packing meat products such as sausage. In this way, industrial waste could be converted into usable and valuable materials. This study was carried out to evaluate the rheological properties of edible collagen film made of cow and sheep's hide. For improvement of rheological properties (tensile strength and elongation value) plasticizer materials were used. These materials involved glycerol 1, 2, 3, 4 and 5 percent (based upon the total weight of the collagen film) alone or with 0.33 percent Carboxyl Methyl Cellulose. Statistical results showed that collagen film containing 5 percent glycerol and 0.33 percent CMC has the highest tensile strength and elongation value.

Keywords: Edible film, collagen, rheological properties, tensile strength, elongation value

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P579

STUDY ON THE SPECIFIC MIGRATION OF ISOPHTHALIC ACID AND TEREPHTHALIC ACID FROM PET BOTTLES INTO DIFFERENT TYPES OF OILS

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Migration from packaging materials are one the most important aspects of food safety. The analysis of monomers, terephthalic acid (TPA) and isophthalic acid (IPA) that migrate from polyethylene terephthalate (PET) bottles into oil was performed by HPLC method with diode array detector (DAD). The selected samples included Sunflower, Canola and Mix oil (contains soy, Sunflower and cotton seed oil) that were packaged in 1 liter PET bottles were kept 10 days in 49 °C, then migrated monomers were extracted by methanol and choloroform from oils. The mean of recoveries for related compounds from oils were prior to analysis from 70% to 106%. The results showed that the amount of specific migration of TPA and IPA in the samples were adopted with EU legislation that identified as specific migration limit (SML). However, unlike to our findings that confirm the safety use of PET, but due to increase favor to use of these materials in food industries, their risk in food safety, still its control for unwanted migration is inevitable.

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P583

STUDY ON THE OVERALL MIGRATION FROM PET BOTTLES INTO DIFFERENT TYPES OF OILS AND EFFECT OF PET PACKAGING AND STORAGE CONDITION ON FATTY ACIDS PROFILE OF COMMON OILS IN IRAN

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Global migration of polyethylene terephthalate (PET) bottles into different types of vegetable oils (sunflower, canola and mix contains sunflower, soy and cotton seed oils) has been determined after 20 and 60 days of storage at 25 and 45 ˚C. The overall migration was calculated by determination the lose weight of plastic (PET) strips during storage. Profiles of fatty acid of each type of oils were determined by Gas chromatography before and after experiment to find the relationship between the amount of overall migration and fatty acids profiles. Result showed that the amount of overall migration from plastics to oils the ranking: mix>sunflower>canola in different condition of storage. Overall migration was found to be higher into oil that contained high amount of unsaturated fatty acids also degree of saturation has direct effect on migration level. Some changes were observed in fatty acids profile in effect of passing time, and increasing temperature, in such a manner that this two agent causes increasing values of saturated fatty acid and mono unsaturated and decreasing of poly unsaturated fatty acids. However amount of migration lower than EU legislation but due to increase favorit to use of these materials in food industries, their risk in food safety, still its control for unwanted migration is predominant and inevitable. Our finding shows the effect of temperature and storage time on amount of migration also storage of oils in low temperature is necessary and storage above than 25 °C will decrease the shelf life of product with increasing migration.

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P584

MICROBIOLOGICAL ASPECTS IN COMPARING MODIFIED ATMOSPHERE PACKAGING AND VACUUM PACKAGING ON SHELF LIFE OF FRESH BULL MEAT

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The importance of meat preservation and various reports on different types of packaging, and to compare the effects of modified atmosphere packaging (MAP) and vacuum packaging (VP) on shelf life of fresh bull meat, and microbiological tests on meat together with some chemical and sensory tests was on tight observation. It was an experimental study, 98 samples were randomly packaged in two groups of MAP and VP equally. The package consists of five layers PA, LLDPA, PE, EVOH, and PVDC. MAP consists of meat with 700 milliliter of CO_2 per Kg of meat. The packaging were made in at-ameh-pars factory and transported in chilled condition to a well prepared refrigerator in National Research Institute of Food Science (NRIFS) of Shahidbeheshti University of Medical Sciences. These samples tested weekly, since first day after packaging, and week 2, 3, 4, 5, 6, 7, and 8. Microbial tests including Total Microbial, Coliform, Lactic Acid Bacteria, Pseudomonas Counts, and looking for Clostridiums. Chemical and sensory tests also carried out. TVN, TBA, and pH as chemical analyses and color, odor, and weep as sensory analyses also added. Results revealed that total microbial count was in standard range within the 6 weeks for VP, and 5 weeks for MAP technique. Other microbial factors including coliforms, lactic acid bacteria are lower and somehow in similar pattern to total count, and no clostridium was found. By the way, chemical and sensory tests emphasized the microbial figures. The results showed that according to our existing facilities, VP is recommended for meat packaging.

Keywords: Vacuum packaging, modified atmosphere packaging, microbial tests, sensory tests, meat, odor, weep, color

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P585

INFLUENCE OF DIFFERENT CONCENTRATIONS OF OREGANO ESSENTIAL OIL ON THE PROPERTIES OF CHITOSAN FILMS

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When selecting packaging for food products, in addition to the better protection and functional characteristics, environmental suitability of packaging must be taken into account. Biopolymers are packaging materials that are made from renewable raw materials, and after the rejection they degrade under the influence of environmental factors. These packaging materials could take a far more significant place among the materials for packaging of food products by optimizing their protective and functional characteristics. The paper describes the procedure for the synthesis of biofilms based on polysaccharide chitosan, with the addition of oregano essential oil. Series of films were produced with chitosan concentration of 0.4% (w/v), and with the addition of increasing concentrations of oregano essential oil (0, 0.2, 0.4, 0.6 and 0.8% (v/v)). Physical, mechanical and barrier properties of these films (thickness, tensile strength, ultimate elongation and gas permeability for O_2, N_2, CO_2) were examined. Results showed that the addition of different concentrations of oregano essential oil to chitosan films resulted in different film look, and its physical-mechanical and barrier properties. Concentration of 0.8% v/v essential oil is the limit concentration for compact film synthesis, according to the procedure described in the paper. The best properties were shown by films with 0.2 and 0.4% oregano oil.

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P586

REWIEV: NATURAL ANTIMICROBIALS AND APPLICATIONS IN FOOD SYSTEMS WITH EDIBLE FILMS

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Antimicrobial packaging is a system that can kill or inhibit the growth of microorganisms, extend the shelf life of perishable products. Since food safety has become an increasingly important concern the application of antimicrobials has received attention. The classification of antimicrobials is basically divided into traditional and novel substances -called "naturals"- depending on their origin. Nowadays consumer preferences are moving towards foods that contain lower levels of chemical preservatives and exhibit more of the characteristics of fresh or natural products. This increasing demand has opened new dimensions for the use of natural preservatives derived from plants, animals or microflora. Natural antimicrobials of animal (lactoperoxidase, lysozyme, chitosan), plant (essential oils, aldehydes, esters, herbs, spices), and microbial origin (nisin) can be used to effectively reduce microorganisms. Antimicrobial food packaging is one of the applications of active packaging conducted by incorporating antimicrobial agents into packaging materials. The antimicrobial packaging can be applied different methods; antimicrobial agent can be incorporated into packaging material, by coating the active compound on the surface of packaging film or by adding a sachets into the package. Because of the environmental concerns, technological problems, the incorporation of natural into biodegradable films is more suitable than their incorporation into plastic films. Promising type of antimicrobial packaging is to incorporate the antimicrobial compound into an edible film or coating. In this review, antimicrobials from natural sources and applications in food systems especially combination with edible films are reviewed. Data about natural antimicrobials used in edible pullulan and zein films will be shown in presentation.

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P587

POST-HARVEST HANDLING OF ORANGE

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Worldwide postharvest fruit and vegetables losses are as high as 30 to 40% and even much higher in some developing countries. Reducing postharvest losses is very important; ensuring that sufficient food, both in quantity and in quality is available to every inhabitant in our planet. The prospects are also that the world population will grown from 5.7 billion inhabitants in 1995 to 8.3 billion in 2025. World production of vegetables amounted to 486 million ton, while that of fruits reached 392 million ton. Turkey produces most of its vegetable itself due to various suitable and climate regions around the country. Reduction of post-harvest losses reduces cost of production, trade and distribution, lowers the price for the consumer and increases the farmers income. Fresh fruits and vegetables are inherently perishable. Oranges are grown in commercial quantities in the field. Consumers buy oranges primarily for their size but are attracted to repeat purchases by flavor and quality. This study focuses on the post-harvest operations of Oranges in Turkey. The post-harvest operations carried out in packinghouses include some or all of the following; dumping, washing, pre-sizing, waxing, sorting, grading, sizing, packing and storage.

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P588

DEVELOPMENT OF ACTIVE ANTIMICROBIAL METHYL CELLULOSE / CARVACROL / MONTMORILLONITE NANOCOMPOSITE FILMS AND INVESTIGATION OF ANTIMICROBIAL PROPERTIES OF THESE FILMS

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In this study, active antimicrobial biodegradable methyl cellulose/carvacrol/ montmorillonite nanocomposite films were prepared as food packaging materials. The structures of nanocomposite films were characterized by XRD and TEM. Film thicknesses, opacity values and thermal behaviors of antimicrobial nanocomposite films were determined. The antimicrobial activities of methyl cellulose / carvacrol film and methyl cellulose / carvacrol / montmorillonite nanocomposite films were tested against Escherichia coli and Staphylococcus aureus at 37 °C. The antimicrobial effects of these films were also examined on the sausage against the same microorganisms. The increase in the montmorillonite concentration within film matrix led to an increase in the film thickness. Moreover, the inclusion of carvacrol, an antimicrobial agent, into the methyl cellulose or methyl cellulose/ montmorillonite film matrix caused a decrease in the film thickness values. The addition of carvacrol into the film matrix resulted in a decrease in the opacity values of films. Active antimicrobial films inhibited completely the growth of Escherichia coli and Staphylococcus aureus. Antimicrobial activity tests of methyl cellulose / carvacrol film and methyl cellulose / carvacrol / montmorillonite nanocomposite film including 60 wt.% of montmorillonite on the sausage showed that these films were effective against both microorganisms in the sausage samples.

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P589

CHARACTERIZATIONS OF METHYL CELLULOSE / MONTMORILLONITE NANOCOMPOSITE FILMS CONTAINING DIFFERENT AMOUNTS OF MONTMORILLONITE

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In this study, the effect of montmorillonite concentration on the thickness, opacity, water adsorption, water solubility and thermal properties of methyl cellulose / montmorillonite nanocomposite films was determined. Methyl cellulose / montmorillonite nanocomposite films including different amounts of montmorillonite (10 wt.%, 20 wt.%, 40 wt.% and 60 wt.%) were prepared. The film thickness of samples was measured with a micrometer. Opacity values were determined using a spectrophotometer. Water adsorption and water solubility of film samples were obtained using gravimetric method. Thermal behaviors of samples were investigated using thermal gravimetric analysis. The increase in the concentration of montmorillonite in the methyl cellulose film structure caused an increase in the film thicknesses and opacity values of nanocomposite films. The amount of water adsorbed onto the film samples at equilibrium decreased with increasing montmorillonite concentration. Adding of montmorillonite to the film matrix led to a reduction in the solubility of films. Thermogravimetric analyses of films showed that thermal stability of methyl cellulose/ montmorillonite nanocomposite films was improved with increasing montmorillonite concentration.

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P593

NANOTECHNOLOGY IN FOOD PACKAGING APPLICATIONS

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Today, food industry and packaging industry play an important role in overcoming of food needs of the growing world population. Packaging is very important to preserve of food's quality and to have a long shelf life. Food packaging materials should be protect foods from adverse chemicals and biological interactions, damages from handling and storage. Also they are expected to be cheap, original, useful and environmentally sensitive designs. In line with these objectives; at today's packaging industry, food packaging that deveoped nanotechnological methods can meet these expectations. Nanotechnological packaging are divided into three sections. These are plastic nanocomposite packaging, biodegradable nanocomposite packaging and active packaging. This packaging offer various solution to different problems such as smart labels that can be informed by monitoring changes of product quality from production to consumption, the temperature-time indicators, barcodes which indicates microbial contaminations. Plastic nanocomposites used in packaging industry is regarded as one of the field that can be growth in the world. This study aims to explain that nanotechnological packaging systems for foods and also reflections of them to food industry and packaging industry.

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P594

EFFECTS OF CLAY CONCENTRATION AND TEMPERATURE ON CARVACROL RELEASE FROM ANTIMICROBIAL METHYL CELLULOSE/ CARVACROL/ MONTMORILLONITE NANOCOMPOSITE FILMS

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Controlling of antimicrobial agent release from food packaging materials is very important. Carvacrol (CRV) has an antimicrobial activity. The aim of this study is to investigate the CRV release from antimicrobial methyl cellulose (MC)/CRV/montmorillonite (MMT) nanocomposite films. The obtaining of controlled CRV release from these films is also aimed. Determination of residual CRV amounts was carried out by spectrophotometric method. CRV releases from MC/CRV films were followed at 15, 25, 35 and 45 °C and in 60 ± 4 % relative humidity for 30 days. MC/CRV/MMT nanocomposite films with different amounts of MMT (0-60 wt.%) were prepared to determine the effect of MMT concentration on the CRV release and CRV losses from these films were followed at 25 °C. The effect of MMT in reducing the CRV loss was also tested at 15, 25, 35 and 45 °C for nanocomposite films including 20 wt% and 40 wt% of MMT. It was found that CRV release from film samples increased with temperature and time. MMT addition to the film matrix caused a decrease in the antimicrobial agent release. CRV release experiments showed that the amount of CRV release from films may be controlled with adjusting of MMT concentration and temperature.

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PREPARATION OF METHYL CELLULOSE/ MONTMORILLONITE NANOCOMPOSITE FILMS WITH DIFFERENT METHODS AS PACKAGING MATERIALS IN FOOD PACKAGING INDUSTRY

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The aim of this study is to determine the most suitable film preparation method for obtaining methyl cellulose / montmorillonite nanocomposite films as food packaging material. Montmorillonite was characterized with several techniques including scanning electron microscopy (SEM), X-ray diffraction (XRD), X-ray fluorescence (XRF) spectroscopy and cation-exchange capacity (CEC) and density analyses of clay were also made. Various film preparation methods including 30 different procedures were developed for this purpose. Homogenizator, ultrasonic treatment and/or magnetic stirrer with different mixing speeds and times were applied in the dispersion part of procedures to prepare a nanocomposite film. The nano structures of methyl cellulose / montmorillonite composite films were evaluated by XRD and TEM analyses. Basal spacing (d_{001}) values of methyl cellulose / montmorillonite composite films obtained from XRD measurements by 30 procedures were higher than the d_{001} value of montmorillonite clay. Thus, it can be said that all methyl cellulose / montmorillonite composite films prepared were of a nanocomposite film structure but a procedure involving mixing by homogenizator was the most effective procedure than the others to separate the silicate layers of montmorillonite. The obtained XRD results were also supported by TEM micrographs.

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FUNCTIONAL PROPERTIES OF BIGEYE SNAPPER (PRIACANTHUS MACRACANTHUS) SKIN GELATIN FILM INCORPORATED WITH CLOVE EXTRACT

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Fish gelatin films have been successfully made. To increase the potential of film utilization, the incorporation of some selected antimicrobial and antioxidants particularly from natural sources, like plant extracts which contain phenolic compounds, can be a promising means to prepare the active packaging. In this study, the effect of clove extract incorporation on functional properties of bigeye sanpper (Priacanthus macracanthus) skin gelatin film was investigated. The clove extract was incorporated into the film-forming solution (FFS) at various concentrations (0-3%). The addition of clove extract could increase the tensile strength and elongation at break, but did not affect the water vapor permeability of the resulting films. From protein pattern, there were no covalent bonds involved in film formation, but other weak bonds rather took place. The higher clove concentrations increased antioxidative and antimicrobial activities of both FFS and the resulting films. However, the lower activities were found in the resulting films. Films incorporated with clove extract at various concentrations could not inhibit the growth of E. coli and C. albicans, while S. aureus was inhibited to some extent. Therefore, incorporation of clove extract at appropriate amount could improve mechanical properties as well as antioxidative and antimicrobial activities of fish-skin gelatin film.

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CHEMICAL AND SENSORY CHANGES OF MARINATED SEABASS (DICENTRARCHUS LABRAX) DURING STORAGE AT 4 (±1) °C

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The aim of the present study was to determine the changes in sensory and chemical quality of Seabass (Dicentrarchus labrax) marinade during the maturing process and during storage in sunflower oil at 4 (±1) °C for 90 days. Seabass fillets (with scales, descaled and skinned) were marinated in a solution composed of 2.5% acetic acid and 11% sodium chloride. After the marination process, the seabass fillets were removed from the solutions, transferred into glass jars, covered with sunflower oil and stored. Sensory and chemical [total volatile basic nitrogen (TVB-N), trimethylamine (TMA-N), thiobarbituric acid (TBA), crude protein and crude fat] analyses were performed during the storage. Sensory analysis values for all samples were within the acceptable limits during the storage of 90 days at 4 °C. Lipid oxidation, as indicated by TBA values, significantly increased in marinated fillets in comparison with the pickled seabass fillets. The mean of TBA values were determined as 8.19 mg at 70 days of descaled samples and 8.04 mg malonaldehyde at 56 days of skinned samples. TVB-N and TMA-N values significantly increased during the storage in sunflower oil. Both of TVB-N and TMA-N values were lower than the acceptable limits during the storage of 90 days.

Keywords: Sea bass, Dicentrarchus labrax, marinade, quality changes, sensory changes.

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CHEMICAL AND SENSORY QUALITY CHANGES OF DIFFERENTLY TREATED SEA BASS THAT FROZEN MORE THAN ONCE AND THAWED IN MICROWAVE CONDITIONS

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This study aim to determine physical, chemical and sensory changes of whole, gutted and fillet seabass (Dicentrarchus labrax) that frozen (-18±2 °C) several times and thawed in microwave conditions (under 135 W, Whole; 45±2.04, Gutted; 40±2.04, Fillet; 34±3.76 min). The acceptability values of fresh sea bass were detected as; 3.82±0.01 for sensory aspects, 6.48±0.00 for pH, 18.85±0.10 mg/100 g fish meat for TVB-N, 3.16±0.00 mg/100g for TMA-N, 0.43±0.01 mg malonaldehyde/kg for TBA, 19.69±0.27 for %crude protein content, 8.54±0.12 for %fat content. After sixth thawing process in microwave condition, the acceptability values of whole, gutted and fillet seabass are determined as 0.74±0.02, 0.68±0.03, 0.74±0.02 for sensory aspects, 6.58±0.01, 6.58±0.02, 6.58±0.01 for pH values; 21.88±0.17, 23.70±0.36, 21.61±0.32 TVB-N; 3.49±0.06, 3.33±0.01, 3.29±0.01 for TMA-N; 0.71±0.04, 0.89±0.05, 0.88±0.05 for TBA; 18.45±0.25, 18.75±0.25 for %crude protein content and 7.20±0.09, 7.18±0.24 ve 7.28±0.24 for %crude fat content. According to the results of this study, it was seen that thawing in microwave is not appropriate for the big and thick fish like sea bass because of being cooked in parts of tail, eye and fins. In addition, dryness in skin, moisture losses in eye fluids and tissue ruptures were detected. Statistically in terms of general acceptability, there was not a significant differences between sea bass groups thawed in microwave but there was a significant difference in terms of crude protein pH, TVB-N and TBA. There were differences between whole, gutted and fillet groups in TMA-N and % fat findings but the differences between whole and fillet groups were not significantly important.

Keywords: Frozen, Thawed, Sea bass (Dicentrarchus labrax), Microwave

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DETERMINATION OF CHANGES IN CONNECTIVE TISSUE TREATED WITH VARIOUS CRYOPROTECTIVE BIOPOLYMERS. A DIFFERENTIAL SCANNING CALORIMETRY (DSC) STUDY

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In this study, sucrose (2%), sorbitol (2%), mannitol (2%), gum arabic (0.15%), carrageenan (0.15%) and meat stabilizer (2%) were blended with ground beef and stored for 6 months separately at -9 °C, -13 °C and -18 °C. Intramuscular connective tissue was isolated from stored samples at 1st, 3rd and 6th months. DSC analyses were performed on these connective tissues. DSC thermograms obtained from intramuscular connective tissue revealed that storage temperatures, storage periods and cryoprotectants had important effect on both denaturation temperature and denaturation enthalpy of connective tissues. Compared with -9 °C, connective tissue samples isolated from stored at -13 °C and 18 °C had higher denaturation temperature. Denaturation temperatures of connective tissue samples were decreased with increasing frozen storage periods, and the lowest values were determined at the end of the 6th month. Considering all treatments, the samples treated with gum arabic and carrageenan had the higher thermal stability while the samples treated with sucrose and mannitol had the lowest denaturation temperature.

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NANOTECHNOLOGY APPLICATIONS IN MEAT TECHNOLOGY

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Functional food applications, performed to improve life quality and human health has shown a crucial increase by development of nanotechnology. Protection of the stability, improvement of the bioavailability, facilitating controlled release and enhancing the solubility of micronutrients are provided by nanotechnology applications. These applications are expected to bring a range of benefits to the food sector, including new tastes, textures and sensations, less use of fat, enhanced absorption of nutrients, improved packaging, traceability and security of food products. Encapsulation, a widespread technique within nanotechnology applications, is used in meat industry to encapsulate food ingredients, such as flavor agents, colourants, preservatives, antioxidants as well as off flavor/odour agents. Addition of encapsulated bacteriocin, nisin, or acidifiers into the fermented meat products provide arrangement of acid fermentation, protection of starter culture, and prevention of growth of the pathogenic microorganisms. Encapsulation technology is successfully applied to prevent the disappearance of volatile aroma compounds and to improve of antimicrobial activity in cured meat products. Product stability is enhanced with mechanic, thermal and barrier properties against environmental factors by the use of cellulose material, silicate, starch nanocrystal, chitin, chitozan, polylactic acid and polyhydroxybutyrate as nanocomposites in meat product packaging. The results of the studies in nanotechnology area in meat industry demonstrate that nanotechnology applications might provide production of meat products with longer shelf life and higher nutritional and technological quality in commercial manufacture.

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POTENT ANTIOXIDANTS AND ANTIOXIDATIVE CAPACITY OF TWENTY-ONE SELECTED TROPICAL PLANTS

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The objective of the study is to evaluate antioxidants and antioxidative capacity of 21 selected tropical plants utilizing four different assays including conjugated diene, scavenging DPPH radical, TBA and chelating ability. Results of the study showed that *Cosmos caudatus* extract was highly effective in the prevention of formation of conjugated diene and in scavenging DPPH radicals. On the other hand, *Centella asiatica* and *Psophocarpus tetragonolobus* extracts demonstrated excellent activity in inhibiting malondialdehyde formation and chelating ability. Interestingly, the antioxidant activity of some of the plants were found to be as good as that of α-tocopherol and BHA. *Lawsonia inermis* extract was found to consist of the highest level of phenolics, catechin, epicatechin and naringenin. Predominant quercetin and ascorbic acid content were identified in *Vitex negundo* extract whereas, *Pereskio bleo* extract showed high content of lycopene and α-tocopherol. Highest β-carotene content was found in *Gynura procumbens* extract. Strong correlation (R=0.8613) was found between radical scavenging activity and total phenolic compounds of the plants. Findings from the study suggested that some of the plants can be excellent sources of natural antioxidants that can be used as functional ingredient in the development of functional foods that are of high demand currently.

Keywords: Antioxidants, antioxidative activity, tropical plants, antioxidant assays

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ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF FRESH RED FLESH PITAYA (Hylocereus polyrhizus) FRUIT PULP

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The antioxidant activity [2, 2-diphenyl-1-picrylhydrazyl (DPPH), ferric thiocyanate (FTC) and conjugated diene] and antimicrobial activity (disc diffusion assay and minimum inhibitory concentration) of ethanolic extract from fresh pulp of red flesh pitaya fruit were evaluated in this study. Results of this study revealed that the extract of red flesh pitaya fruit pulp scavenged 60.7% of the free radicals at 100mg/mL while exhibiting 82.5% inhibition towards formation of conjugated diene at 10mg/mL. However, using FTC assay the extract showed only 13.5% lipid peroxidation inhibition as compared to that of positive controls. Screening of the antimicrobial properties of the fresh red flesh pitaya fruit pulp only exhibited mild activity against *E. coli* (ATCC 25922) and *K. pneumoniae* (ATCC 13883) with the disc potency of 10mg as compared to 10μg Ampicillin that served as the positive control. The extract also inhibited the growth of all bacteria spectrophotometrically at 125mg/mL after 24 hours incubation except for *S. aureus* (ATCC 25923). In conclusion, red flesh pitaya fruit pulp has great potential to be a source of natural antioxidant and antimicrobial agent.

Keywords: Red flesh pitaya fruit, *Hylocereus polyrhizus*, antioxidant activity, antimicrobial activity

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P603

STORAGE STABILITY OF HAMBURGER PATTIES FORMULATED WITH DIFFERENT BEEF TRIMMING RATIOS AND ROSEMARY ESSENTIAL OIL

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Effect of rosemary essential oil (REO) addition (1%) on microbiological, chemical and physical characteristics of hamburger patties formulated with different beef trimming ratios (0, 25, 50, 75, and 100%) was investigated during frozen storage (-18°C) for 6 months. Increases in the ratio of beef trimmings added to hamburger formulations resulted in higher lipid and connective tissue, and lower protein contents ($p<0.05$). Weight loss and diameter reduction after cooking increased depending on the ratio of beef trimmings used in hamburger patties. Antimicrobial activity of REO was observed against total aerobic mesophilic bacteria, total psychrophilic aerobic bacteria, *Staphylococcus* spp., and total coliforms towards the end of frozen storage with the greatest effect determined against *Staphylococcus* spp. Lipid oxidation as measured with thiobarbituric acid (TBA) value in hamburger patties increased with increases in the ratio of beef trimmings and decreased with incorporation of REO ($p<0.05$). Incorporation of beef trimmings and REO had no significant effects on CIE L* (lightness) values ($p>0.05$) whereas a* (redness) value decreased with increasing ratios of beef trimmings in hamburger patties ($p<0.05$). This study suggests that beef trimmings as a low cost meat-by-product might have potential for use in processed meat products provided that it is added at limited concentrations.

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P605

THE EFFECT OF DIFFERENT LEVELS OF SUNFLOWER HEAD PITH POWDER ON SOME EMULSION ATTRIBUTES OF MECHANICALLY DEBONED CHICKEN MEAT

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In this study, the effect of sunflower head pith powder at various concentration (0.0, 0.5, 1.0, 1.5, 2.0%) on the emulsion properties of mechanically deboned chicken meat (MDCM) was investigated in a model system. For this purpose, fresh and frozen MDCM samples were used for preparing the oil/water (O/W) model emulsion systems. pH values of slurries and emulsions, emulsion capacity (EC), stability (ES) and viscosity (EV) of the prepared model system emulsions were analyzed. Protein, fat, ash, dry matter contents and pH value of MDCM were 14.85, 14.93, 0.99, 30.45% and 6.7, respectively. It was found that the pith powder additon significantly ($P<0.01$) decreased the pH values of slurries. On the other hand, the effect of pith powder addition on pH values of emulsions was insignificant ($P>0.01$). The highest EC value was reached when 1% of pith powder added. ES values of the emulsions reached a maximum level at 1.5% pith powder level. Fresh MDCM emulsions had higher EV values than did frozen MDCM emulsions at 10, 20, 50 rpm.

Keywords: Mechanically deboned chicken meat, sunflower head pith powder, emulsion properties

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P606

COMBINED EFFECT OF ESSENTIAL OIL (OREGANO OR THYME) AND NISIN ON SHELF-LIFE EXTENSION OF AEROBICALLY PACKAGED FRESH CHICKEN BREAST MEAT, STORED AT 4 °C

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The combined effect of essential oils: oregano (0.1% v/w) or thyme (0.5% v/w) and the bacteriocin nisin (500 IU/g) on shelf-life extension of fresh chicken meat stored at 4 °C was investigated over a 20 day storage period. The following parameters were monitored: microbiological (Total viable counts (TVC), *Pseudomonas* spp., Lactic Acid Bacteria (LAB), Yeasts, *Brochothrix thermosphacta* and *Enterobacteriaceae*), physico-chemical (pH, thiobarbituric acid test (TBA), color) and sensory (odor and taste) attributes. Microbial populations were reduced up to 4.2 log cfu/g for a given sampling day (day 9), with the more pronounced effect being achieved by the combination of nisin and thyme essential oil at a concentration of 0.5% v/w. TBA values for all treatments remained lower than 1 mg malondialdehyde (MDA) kg^{-1} of meat throughout the 20 day storage period. pH values varied between 6.4 (day 0) and 5.9 (day 20). The L* parameter values decreased with time. Both oregano and thyme oil partly protected color lightness. Color parameters a* and b* were not affected by treatments. Finally, sensory analysis showed that both essential oils at the concentrations used resulted in a desirable odor and taste of the product. Based primarily on sensory evaluation and secondarily on microbiological data, shelf-life was 6 days for the control samples, 9 days for samples treated with nisin, 12-13 days for samples treated with nisin and 0.1% oregano oil and 15 days for samples treated with nisin and 0.5% of thyme oil. Thus, the combination of nisin and essentials oils (oregano or thyme) exhibited an additive preservative effect.

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P607

THE EFFECT OF SODIUM TRIPOLYPHOSPHATE AND TUMBLING ON LIPID AND COLOR CHANGES OF DONER

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This study was designed to determine the effects of sodium tripolyphosphate (STPP) and tumbling on lipid and color changes of raw and cooked doner. The beef meat was tumbled or nontumbled after marinated with a sauce including 0% and 0. 25% STPP. Tumbling was performed as two different applications: 30 min intermittent (3 min work, 2 min rest period) and 20 min continuous. Analysis were carried out on the same day of manufacturing and after 48 hour marination at 4 °C. For raw doner groups, intermittent tumbling increased TBA value whereas STPP decreased TBA value ($p<0.01$). The use of STPP decreased FFA value from 1,32 to 1,20 mg malonaldehyde/kg samples ($p<0.01$). The increase of a* value was observed on the second day ($p<0.01$). Tumbling and marination time had a significant two-way interaction for b* value ($p<0.01$). b* value was found higher in non-tumbled and continuous tumbled groups on the second day. In addition, the use of STPP decreased b* value ($p<0.05$). For cooked doner samples, STPP significantly decreased TBA and FFA values in tumbled groups ($p<0.01$). No difference were determined for L* and b* values ($p>0.05$) whereas continuous tumbling increased a* value of samples containing STPP ($p<0.01$).

Keywords: Doner, tumbling, sodium tripolyphosphate, lipolysis, lipid oxidation, color changes

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P609

EFFECT OF CHITOSAN INCORPORATION ON QUALITY CHARACTERISTICS OF MEATBALLS

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The present study was conducted to evaluate the effectiveness of chitosan addition at different concentrations (0, 0.5, 1.0 and 1.5%) on some chemical, physical and functional characteristics of meatballs during refrigerated storage (4 °C) for 4 days. Chitosan addition resulted in higher pH value as compared with the control group ($p<0.05$). Cooking loss and diameter reduction after cooking decreased, and moisture retention increased with increasing concentration of chitosan. In texture profile analyses, chitosan incorporation resulted in higher hardness and lower adhesiveness for raw samples whereas higher cohesiveness, springiness and chewiness for cooked samples ($p<0.05$). Chitosan incorporated meatballs had lower thiobarbituric acid (TBA) values than the control. Color stabilizing effect of chitosan was observed with higher CIE redness (a*) values and lower metmyoglobin percentage in comparison to control over the refrigerated storage. The results of the present study provide evidence that chitosan might improve functional and physical quality characteristics of meat products with an inhibitory effect on oxidative deteriorations in lipids and myoglobin pigment.

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CONTRIBUTION OF FREEZ-DIRED SARCOPLASMIC PROTEINS ON THE TEXTURAL PROPERTIES OF SURIMI GEL

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The role of fish sarcoplasmic proteins (Sp-P) in gel formation during the production of surimi and kamaboko is unclear. This study examined the effect of common carp Sp-P on the gel characteristics of threadfin bream surimi and kamaboko with adding freeze-dried Sp-P at concentrations from 0 to 35% (w/w). Gel electrophoresis confirmed the presence of Sp-P bands ranging from less than 10 to ~97 KDa after freeze-drying. During a temperature sweep test, depth of G′ graph could be correlated inversely with the Sp-P concentration. Afterward the G′ increased from *ca.* 1.4 KPa to 2.9 KPa for surimi with no added Sp-P (control) and 35% added Sp-P, respectively. G′ values for kamaboko at 80ºC increased more than 3 fold (273%) from 3.3 KPa for control samples to 12.3 KPa for samples with 35% Sp-P added. Furthermore, there was a significant linear correlation (R^2=0.98) between gel strength and concentration of added Sp-P. Compared with the control, the addition of 5% Sp-P improved gel strength by *ca.* 80% and after adding 35% Sp-P, the gel strength increased to *ca.* 88 g.mm which was 388% greater than that with 5% added Sp-P. The number of the polygonal structures/mm^2 measured in SEM (x1000) were not significantly ($p>0.05$) affected by the addition of Sp-P. However, at x4000 magnification, the thickness and depth of the polygonal structures were discernibly greater. It was concluded that the effect of Sp-P on gel formation was positive as kamaboko displayed improved gel properties with no evidence of physical interference.

Keywords: Sarcoplasmic proteins, surimi, microstructure, gel characteristics

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EVALUATION OF GRAPE SEED FLOUR IN FRANKFURTER PRODUCTION

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Wine by-products (seeds, stem, peels) are left over which are often discarded as waste or used as cattle feed. However, these products could be evaluated for human consumption due to their high nutritional content. Grape seed is a rich source of proanthocyanidins and can be an alternative material for using in various food products owing to its high dietary fibre (40%) content. In this study, seven concentrations (0, 0.5, 1, 2, 3, 4, 5%) of grape seed flour (GSF), prepared from wine industry grapes, was used in the formulation of beef Frankfurters in place of starch plus sodium caseinate in order to increase quality, nutritional and technological characteristics of the products. According to the results, the higher the moisture values the lower the fat values of the products. The pH values varied between 5.97– 6.12. The increment of GSF in the Frankfurters enhanced the protein, total dietary fibre and water holding capacity of the treatments ($p<0.05$). However, GSF addition reduced the sensory scores.

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THE SUBSTITUTION OF ANIMAL FAT WITH GRAPE SEED OIL IN FRANKFURTER MANUFACTURE

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Frankfurters are usually known to have negative effects on human health due to their high animal fat content. Unlike animal fats, vegetable oils have no cholesterol but high amount of unsaturated fatty acids. Grape seed is also a source of vegetable oil (14-17%) which contains mostly linoleic acid. In this study, grape seed oil was incorporated into beef Frankfurters at different levels (0, 1, 2, 4, 6, 8 and 10%) and its effects on moisture, fat, pH, fatty acid profile and sensory properties of the products were investigated. Addition of grape seed oil significantly affected the moisture, fat and pH values of Frankfurters ($p<0.05$). It was noticed from the results that the higher the moisture values the lower the fat values. The replacement of animal fat by grape seed oil increased PUFA/SFA ratio in the products ($p<0.05$) due to the increment of unsaturated fatty acids, linoleic acid in particular. Frankfurters containing higher levels of grape seed oil were found generally less acceptable than the control ($p<0.05$), but further studies are needed to improve sensory scores.

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THE EFFECTS OF GRAPE SEED EXTRACT ON QUALITY PROPERTIES OF BEEF FRANKFURTERS

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Grape seed extract is an industrial derivative from whole grape seeds and includes oligomeric proanthocyanidins recognized as powerful antioxidants. In this study, grape seed extract at five different concentrations (0.01, 0.03, 0.05, 0.1, 0.3 and 0.5 %) was incorporated into beef Frankfurters and the quality characteristics of the Frankfurters were evaluated. The moisture, fat and pH values of the Frankfurters were significantly different ($p<0.05$). Lipid oxidation of the products was analysed with TBA test and according to the results, the Frankfurters including grape seed extract had lower TBA values than the control during storage (90 days), probably due to the high antioxidant content. However, TBA values of all the Frankfurters were under the limit of deterioration. Sensory evaluation showed that Frankfurters containing 0.01, 0.03, 0.05, 0.1% grape seed extract were as acceptable as the control ($p>0.05$) in terms of the overall acceptability, but Frankfurters containing 0.3 and 0.5% grape seed extract were found less acceptable ($p<0.05$).

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P614

A RESEARCH ON DETERMINATION OF THE OPTIMUM EXTRACTION CONDITIONS OF TRADITIONAL CONFINED SORBET "*KAYNAR*" BY REFRACTOMETRY

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This research was carried out in order to determine optimum conditions for the extraction of water soluble dry matter (WSDM) from traditional Confined Sorbet "Kaynar". For this purpose, Kaynar spice mixture belonging to five different brands were purchased in Adana proviance, Turkey in 2010, and used as study material. Kaynar spice mixture consists of clove "Eugenia caryophyllata Thunb.", cinnamon bark "Cinnamomum verum, C. zeylanicum, C. cassica", allspice "Pimenta dioica L. Merrill", ginger "Zingiber officinale" and galanga "Alpinia galanga". To study the influence of applied cooking time and temperature on WSDM content in the Kaynar during traditional production, an Abbé refractometer thermostatted at 20 °C was used. At the end of the laboratory-scale production of traditional Confined Sorbet "Kaynar", the highest WSDM content (approximately 30 %) were reached in 35 minutes and 97 degrees centigrade. Depending on applied cooking time and temperature, increase in WSDM of Confined Sorbet "Kaynar" was observed.

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P619

CHEMICAL AND MICROBIOLOGICAL PROPERTIES OF NATURALLY FERMENTED HERBS USED IN HERBY CHEESE PRODUCTION

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The present study was conducted to determined microbiological and some chemical properties of spontaneously fermented herbs using for traditional herby cheese production in Turkey. For this aim 21 of brined herb samples belonging to Allium sp., Thymus sp., and Ferula sp. were used for experiment materials. All samples were analyzed for salt, titrable acidity, and pH as well as microbiological plate count including Staphyloccus aureus, Clostridium spp., E. coli. According to results the mean salt value was determined as 7.46%, acidity was 0.07% and the average of pH was 4.03. The means of total aerobic mesophilic bacteria, total anaerobic bacteria, lactobacilli, lactococci, and yeast-moulds, in the herb samples were determined as 6.20, 4.74, 6.05, 5.68, and 4.83 log cfu/g respectively. Out of 21 samples 10 give positive results for S. aureus (mean value 3.34 log cfu/g), 2 give positive results for Clostridium spp. (mean value 2.17 log cfu/g), one give positive results for both coliform and E. coli.

Keywords: Herbs, chemical properties, microbiological properties

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P621

TEXTURAL CHANGES OF SQUID (PHOTOLOLIGO DUVAUCELII) AND CUTTLEFISH (SEPIA ACULEATA) STORED IN ICED

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The aim of this study was to investigate the changes in texture and protein of squid (Photololigo duvaucelii) and cuttlefish (Sepia aculeata) species caught in Thailand during iced storage for 16 days. Shear force of raw and cooked (70 °C for 1 min) mantle was measured using Texture Analyzer equipped with Warner-Blatzler shear apparatus. The hand-feeled firmness of raw sample was carried out by Multisample Difference Test. The changes in protein, including sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE), trichloroacetic acid-soluble peptides (TCA-soluble peptides) content and microstructure using scanning electron microscopy (SEM) were examined. Firmness and shear force of the mantle from both species decreased as storage time increased ($p<0.05$). The decrease in texture was coincidental with the increase in TCA-soluble peptides content ($p<0.05$), indicating protein degradation. In addition, SDS-PAGE pattern showed that myosin heavy chain was degraded after 8 days of storage. SEM revealed an initial compact structure of both species was loosened during the extended storage. Destruction of muscle fiber and the degradation of muscle proteins might be associated with the soften texture of squid and cuttlefish mantles.

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EFFECTS OF A COMBINATION OF HIGH-PRESSURE AND MILD HEAT TREATMENT ON THE MICROBIOLOGICAL AND PHYSICOCHEMICAL QUALITY OF A CONVENIENCE CHICKEN MEAL DURING CHILLED STORAGE

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The application of high-pressure (HP) processing has shown considerable potential as an alternative technology to heat treatments, in terms of assuring safety and quality attributes in minimally-processed food products. The objectives of this research were to study the effects of a combination of HP (300 or 400 MPa for 5 min) and mild heat treatment (20 or 60°C) on the microbiological and physicochemical changes on chicken meal (chicken breasts fillets, red sauce and vegetables (diced carrots and green beans)) and stored under modified atmosphere packaging at 4°C. In general, HP-treated chicken meal had significantly ($P < 0.05$) lower cooking loss, lipid oxidation (TBAR'S) and higher pH and CIE *L*-, *a*- and *b*-values compared to untreated samples; the values were dependant on the pressure and temperature treatment. During storage, the TBARS increased significantly ($P < 0.05$) in both untreated and HP-treated samples. From the microbiological point of view, immediately after HP treatment the microbiological load was below the detection limit and HP delayed subsequently microbial growth compared to untreated samples. The shelf-life of the chicken meal HP-treated at 400 MPa at 60°C was 23 days more than the untreated sample. From a sensory point of view, chicken meal immediately after HP treatment was rated with better overall acceptability than untreated samples. The results of this study suggested that pressure effect can be enhanced by combining it with mild heat and the combination processes are likely to reduce the severity of process requirements.

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UTILIZATION OF MODIFIED WHEAT FLOUR IN EMULSION TYPE SAUSAGES

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The aim of this work was to study the effect of the addition of modified wheat flour (MWF) in emulsion type sausages. Four concentrations of modified wheat flour (0, 3, 6, 9%) was added to sausage formulations. Batter was stuffed into artificial casings cold smoked at 30°C was performed than sausages were kept in the cooking chamber until the geometric center of each chub reached 72°C. When the endpoint temperature was achieved, the sausages were immediately chilled in ice. Raw and cooked sausages were analysed for moisture, fat, protein and ash. Processing yield, binding properties, colour, texture and sensory properties of sausages were evaluated. Results demonstrated that moisture content decreased with increasing amounts of MWF. Adding MWF significantly effected water holding capacity of sausage samples ($P<0.05$). Outer and iner lightness (L*) and redness (a*) of sausages were significantly ($P<0.05$) affected by the concentration of MWF. Increasing amounts of MWF resulted softer texture ($P<0.05$). The formulations which gave products with sensory properties similar to conventional sausages were sausages with 3 and 6% MWF. It could be concluded that Modified wheat flour is a potential source for emulsion type sausages. Further research should be focused on the use of higher amounts of MWF in sausage formulations combination with fiber sources.

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P625

THE EFFECTS OF POTATO PUREE ON SOME QUALITY CHARACTERISTICS OF SARDINE (*SARDINE PILCHARDUS*) PATTIES

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Sardine is an important species in Turkey. It is generally consumed as fresh, canned or salted. There is a growing interest of using fish meat in comminuted products such as fish fingers, burgers and patties in food industry. In this study four concentrations of potato puree were added to sardine patties. Raw and cooked patties were analysed for moisture, fat, protein and ash. Patties were further evaluated for cooking characteristics (cooking loss, fat retention, moisture retention and shrinkage), colour parameter, texture and sensory properties. Cooked patties were stored at 40^{0}C for 7 days and peroxide values and TBA values were evaluated. Potato puree improved cooking characteristics of the sardine patties. Potato puree resulted lower cooking loss and increased moisture retention. Incorporation of potato puree resulted higher L* values. TBA and peroxide values increased during the storage period. Sensory properties of colour, appearance, flavour and texture were within acceptable limits. It was concluded that mashed potatoes was a suitable extender for sardine patties.

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MEAT QUALITY ASSESSMENT USING BIOPHYSICAL METHODS

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One problem facing the meat industry is to obtain reliable information on meat quality over the production process, which would ultimately provide a guaranteed quality of meat products for consumers. To overcome this problem requires fast, accurate and non-invasive techniques for predicting technological and sensory qualities. Over the last few years, a number of biophysical methods have been developed to measure meat quality traits objectively. To determine meat quality by using different biophysical methods (i. e., tenderness, flavour, juiciness, colour) can be used either mechanical (i. e., Warner–Bratzler shear force), optical (colour measurements, fluorescence) electrical probing or using ultrasonic measurements, electromagnetic waves, NMR, NIR. The main aim of the biophysical methods; not only for the development of a diagnostic system making it possible to determine the muscular origin of a meat sample and therefore to optimize production processes, but also with non-invasive methods, it is possible to provide high-quality meat product for consumers. Biophysical methods of assessment can either measure meat component properties directly or calculate them indirectly by using obvious correlations between one or several biophysical measurements and meat component properties.

Keywords: Biophysical methods, meat quality, non-invasive techniques

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P627

SOME ORGANOLEPTIC AND PHYSICAL PROPERTIES OF GLUTEN-FREE BISCUITS MADE WITH VARIOUS FLOURS

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The purpose of this study was to investigate some physical and organoleptic properties of gluten-free biscuit samples. Chickpea, corn, rice and potato flours were used as 100% and their mixtures in halves. Sugar, hydrogenated vegetable oil, salt, baking powder, guar gum and water were used as other ingredients. 10 types of biscuit samples were investigated for sensory properties, Hunter L, a, b values, spread ratio and weight loss values. The sensory results showed that overall acceptability, color, taste, odor and texture scores were differed significantly for some samples. Biscuit samples made by flour mixtures were generally had better scores than those made by single types of flours. The low color scores of the samples prepared with rice flour were observed to be corrected by the addition of potato and chickpea flours. Chickpea flour addition decreased the spread ratio and weight loss significantly in contrast to potato and rice flours. While rice and corn flour addition resulted higher L and lower b values, use of potato flour increased the a and b values.

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COMPREHENSIVE CHARACTERIZATION OF A LEMON VERBENA EXTRACT BY COMBINED USE OF CE AND HPLC WITH MS DETECTION (TOF/IT)

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Lippia citriodora, also called lemon verbena, is a deciduous shrub whose leaves are rich in phenolic compounds, mainly flavonoids, phenolic acids and phenylpropanoids. Lemon verbena leaves are used to add a lemony flavour to foods and beverages, as well as in folk medicine. In this way, they have traditionally been used for the treatment of asthma, fever, gastrointestinal disorders and skin diseases. The medicinal and alimentary uses of extracts from this plant make essential the comprehensive knowledge of their composition. In this work, high-performance liquid chromatography (HPLC) and capillary electrophoresis (CE), both coupled to different mass spectrometry analyzers, time of flight (TOF-MS) and ion trap (IT-MS), were used to carry out the qualitative characterization of a lemon verbena extract. The complementary data generated by CE-MS and HPLC-MS together with mass accuracy and true isotopic pattern provided by TOF-MS analyzer and MS/MS spectra acquired by IT-MS analyzer, made possible the determination of many well-known phenolic compounds present in lemon verbena. Also some iridoid glycosides and flavonoids were found for the first time in this plant.

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CHARACTERIZATION AND IN VITRO ANTIOXIDANT CAPACITY OF HIBISCUS SABDARIFFA AQUEOUS EXTRACT AND ITS ANTI-HYPERLIPEMIC EFFECT IN LDLR-/- MICE

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The Hibiscus sabdariffa (family: Malvaceae), usually named bissap or karkade is a tropical plant commonly used as local soft drink. Traditionally, it has been used effectively against hypertension, inflammation, and liver disorders. Previous studies showed that H. sabdariffa possesses anti-tumoral, anti-oxidant and antihyperlipidemic activities. The determination and quantification was carried out using reverse phase high-performance liquid chromatography (RP-HPLC) coupled with both, diode array detection, (DAD) and electrospray ionization-time-of-flight-mass spectrometry (ESI-TOF-MS). The free radical scavenging activity was determined with different methods: ORAC, TBARS, FRAP and TEAC assays. To further assess H. sabdariffa aqueous extract bioactivity, it was administered as sole drinking fluid to male LDLr$^{-/-}$ mice fed with a high fat-high cholesterol diet in order to assay its anti-hyperlipemic effects. The proposed LC-DAD-MS method exhibited excellent performance in the determination and quantification of the different families of phenolic compounds in H. sabdariffa. Its hypolipemic effects were tested on low density lipoprotein receptor deficient mice. Serum cholesterol concentration increased in both dietary groups, but this difference was only significant in those animals fed with chow diet. The strongest bioactivity was observed on serum triglyceride concentration when a high fat diet was fed, reducing it up to 50%.

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DETERMINATION OF SOME FUNCTIONAL AND TECHNOLOGICAL PROPERTIES OF TURKEY BREAST MEAT PREPARED BY THE ADDITION OF DIFFERENT LEVELS OF SUNFLOWER HEAD PITH POWDER

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The aim of this study was to determine the effect of the addition of sunflower head pith powder (SHPP) in turkey meat emulsion system. SHPP at five concentrations (0.0%, 0.5%, 1.0%, 1.5% and 2.0%) were added to fresh and frozen turkey breast meat (TBM). Chemical composition (moisture, protein, fat, ash, pH, heme iron and metmyoglobin contents) and colour characteristics (*L*, a*, b**, chroma and hue angle) of TBM, some technological properties such as cooking loss (CL), emulsion capacity (EC), stability (ES) and viscosity (EV) of the prepared model emulsions were determined. The addition of SHPP increased the EC and maximum EC value was observed 1% of SHPP added. Also fresh TBM emulsions had higher EC than did frozen TBM emulsions. ES values increased with SHPP addition but CL value decreased. Emulsion viscosity (EV) values were effected with an addition of SHPP.

Keywords: Turkey breast meat, sunflower head pith powder, technological properties.

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FUNCTIONAL PROPERTIES OF MECHANICALLY DEBONED TURKEY MEAT EMULSION SYSTEMS FORMULATED WITH DIFFERENT LEVELS OF SUNFLOWER HEAD PITH POWDER

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The effect of addition of sunflower head pith powder at six concentrations (0.0, 0.5, 1.0, 1.5, 2.0 and 2.5%) on the functional properties of emulsions of mechanically deboned turkey meat (MDTM) was studied by using a model system. Fresh and frozen MDTM samples were used to prepare oil/water (O/W) model emulsion systems. Emulsion capacity (EC), stability (ES) and viscosity (EV) of the prepared model system emulsions, and pH values of slurries and emulsions were analyzed. The addition of pith powder increased the EC and the highest EC was reached when 1.5% of pith powder was added; however, further increase in the pith powder concentration caused an inverse trend in these values. Fresh MDTM emulsions had higher ES values than did frozen MDTM emulsions. The highest ES value was reached when 1% of pith powder was added. In addition, increasing levels of sunflower head pith powder decreased the pH values of slurries and emulsions. Frozen MDTM emulsions had higher EV values than did fresh MDTM emulsions at different rotational speeds, 10, 20, 50 rpm. The addition of sunflower head pith powder at 1.5% level was remarkably different from those at the other levels regarding EV values.

Keywords: Sunflower head pith powder, mechanically deboned turkey meat, emulsion capacity, emulsion stability, emulsion viscosity.

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STATUS OF FISHERIES IN TURKISH FOOD SECTOR

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Turkey is surrounded by sea on three sides and has coastline about 8333 km length. Although fisheries is important area in food sector with having over 350 manufacturing plant, approximately 150 seafood processing plants with export certificate mainly producing of trout, seabass and seabream our country is still behindhand when considering the consumption of the EU and other countries. Despite there is over 150.000 tone production capacity in our country the consumption is stil 8 kg. It shows that Turkish people do not give appropriate attention to fish. This low rate is due to reason such as; people live in our country are not used to fish culture, the fish prices are very high in restaurants, there are not enough fish selling or fish restaurants in every locality, it is a more perishable foodstuff than red meat, cooking and cleaning process is laborious, smell of fish is permeated to kitchen and whole house, it has a bony structure and there are restricted variety of finished products in marketplaces, etc. Being digestible easily, healthy, rich and delicious, the fishery products should be introduced further. We should attach more importance to expand cold chain to every part of the country, to increase fish consumption in primary schools, to provide reasonable price policy, to use water resources accurately and sustainable, to produce healthy and hygienic products by making collaboration between state, university and private establishments in fisheries.

Keywords: Food sector, Seafood, Processing, Fish consumption

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SOME PHYSICAL PROPERTIES OF WHITE PEPPER (PIPER NIGRUM L.)

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White pepper made by drying and pulverizing the white pepper is used as a spice and flavor ingredient in the food industry. The physical properties of white pepper are essential for the design of equipment and facilities for the harvesting, handling, conveying, separation, drying, aeration, storing and processing. The objective of this study was to investigate some moisture-dependent physical properties of white pepper namely, linear dimensions, thousand seed mass, projected area, sphericity, bulk density, true density, porosity, terminal velocity, static coefficient of friction against different materials. As a result, the average length, width and thickness were 5.00 mm, 4.56 mm and 4.54 mm, respectively, at 9.28% dry basis (d.b.) moisture content. In the moisture range from 9.28% to 18.94% d.b., studies on rewetted white pepper seed showed that the thousand seed mass increased from 39.71 g to 48.31 g, the sphericity from 0.925 to 0.959 and the terminal velocity from 5.25 m s-1 to 5.58 m s-1. The bulk density, true density, porosity and static coefficient of friction of white pepper will be given in the paper.

Keywords: White pepper; spice food, physical properties; moisture content.

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AN ENVIRONMENTAL FRIENDLY FISH SMOKING TECHNIQUE FOR BETTER QUALITY AND SUSTAINABILITY

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This study deals with the development of appropriate sustainable strategies for environmental friendly aquatic product processing systems. In this regard, the interactions between the aquatic system and its environment are first defined. Second, the effect of environmental pollution decreasing the raw fish quality in the aquatic systems has been exposed. Third, some sustainable strategies for improving the raw fish quality and minimizing the environmental impact of the aquatic system are developed. Finally, a case study, including the cold-air drying and liquid smoking of the fishes is presented to study sustainability and environmental impact aspects by considering some fish quality parameters, such as total volatile nitrogen, thiobarbituric acid, free fatty acids, and microbiological properties. Furthermore, the results show that the best method for better sustainability and reduced environmental impact is the low-temperature high-velocity (LTHV) cold-air drying with liquid smoking. Moreover, the drying temperature should be selected to be 4oC providing the best quality of fish with the least environmental effect. As a result, the LTHV drying assisted liquid smoking technique is a potential technique for fish drying industry in order to achieve better product quality, sustainability and reduced environmental impact.

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THE MICROBIOLOGICAL QUALITY OF LOW TEMPERATURE HIGH VELOCITY (LTHV) DRYING ASSISTED LIQUID SMOKED FISH

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In this study, microbiological quality and shelf life of LTHV (Low Temperature High velocity) assisted liquid smoked Mackerel, Bream and Anchovy have been investigated by depending on their drying characteristics obtained by applying single layer drying technique in a cyclone-type dryer. In this regard, the fish samples with 2% of salt in average have been first smoked, and then dried at 4 and 25 °C in 7 m/s. The following parameters have been estimated: i) total viable count, ii) Total psycrophil, iii) Total lactic acid bacteria, iv) Total yeast and mold. Furthermore, the microbiological qualities of the samples have been determined in 10 days intervals. Consequently, at the beginning of the storing period, it has been respectively estimated that TVC, TPC, TLB and TYM are 2.42, 1.39, 2.20 and 1,61 at 4 °C and 2.66, 2.77, 3.0, and 2.42 log cfu/g at +25°C for mackerel samples; 2.10, 2.04, 2.20, and 1.85 at 4°C, and 2.60, 2.81, 2.31, and 2.57 log cfu/g at 25 °C for striped sea bream; 2,20, 1.78, 3.0, and 1.99 at 4°C and 2.61, 2.65, 3.0 and 2.23 log cfu/g at 25 °C for anchovy. LTHV technique applied at 4°C contributes to improve the microbiological quality and shelf life of the liquid smoked fish ($p<0.05$).

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EFFECT OF BLENDING CHITOSAN AND ZEIN ON THERMAL PROPERTIES OF COMPOSIT BIODEGRADABLE EDIBLE FILMS

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Edible films and coating are thin films prepared from bio polymers that act as a barrier to external elements factor such as (moisture, oil and water vapor) and thus potect the products and extend its shelf life. Zein protein (prolamin of corn) is one of the best biopolymers for edible film making. chitosan (ch), can be readily obtained from chitin, has been well known for its excellent film forming property.The thermal properties of composit films, plasticized with glycerol (gly) and poly ethylene glycol(peg) were evaluated. The thermo-mechanical properties of chitosan (C), zein (Z) and chitosan-zein (CZ) composite films were investigated by dyenamic mechanical thermal analysis (DMTA). Composite films were prepared by blending of chitosan and zein solutions at various compositional ratios and using of casting technique. For the composite films, there was no clear evidence of separate phase transitions of the individual polymeric constituents or a separate polyol phase. The results showed that the composite films increase glass transition temperature (Tg) of zein films. chitosan that added to zein had more (Tg) compare to zein films. DMTA results showed increase in storage modulus of blend films In conclusion by adding chitosan to zein the thermal properties of blend films had improved

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MACHINE VISION APPLICATIONS TO SEAFOOD: A REVIEW OF KODIAK STUDIES

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Automation and objective evaluation are becoming more important in seafood processing, with more stringent quality and reporting requirements. Machine vision can fulfill many functions at once in a seafood processing line: sorting by species, by size, and by visual quality attributes. There has been a long history of work with machine vision applied to seafood at the Fishery Industrial Technology Center in Kodiak. The objective of this presentation is to briefly describe the sorting of salmon by size, and by degree of watermarking, the evaluation of salmon fillets for quantification bruising and gaping, the size-sorting of whole Alaskan pollock and determination of volume, the quantification of quality defects of pollock roe, as well as size sorting, and the prediction of oyster volume. The various image acquisition and processing techniques will be discussed. The accuracy of these methods will be presented. Some difficulties of the applications of machine vision will be mentioned, as well as the great promise that it carries in many aspects of seafood processing.

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OSMOTIC DEHYDRATION OF MINT AT DIFFERENT TEMPERATURES AND SALT CONCENTRATIONS

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Osmotic dehydration of mint (Mentha piperita) at the different temperatures (15 °C, 25 °C and 40 °C) and different salt concentrations (5%, 12.5% and 20%) was investigated. The effect of different salt concentrations and temperatures on the weight reduction (WR), solid gain (SG), water loss (WL) and color change were investigated. Temperature (in this range) was found to be non-significant parameter for osmotic dehydration ($p>0.05$) after analyzing the data statistically. It was found that immersion time and salt concentration were the most significant factors affecting WL, SG and WR during osmotic dehydration of mint. The weight reduction and solid gain increased with increased salt concentration. The total color change of mint with increased salt concentration and temperature was also determined during osmotic dehydration. No significant changes observed in color parameters. Therefore use of osmotic dehydration process for mint, particularly prior to drying process could provide quality improvement in terms of color, texture and flavor etc.

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REDUCTION OF 5-HYDROXY-2-METHYL FURALDEHYDE (HMF) CONCENTRATION IN FRIED POTATO MODEL

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HMF and other Maillard products are formed at high temperature in food processing. These products are visible to the naked eye as brown coloration of products that are fried or oven-baked, such as crisp bread and processed potato products. Potato cubes were fermented by three kind of bacteria (Lactobacillus bulgaricus, Lactococcus cremoris and Leuconostoc mesenteroides) and yeast (Zygosaccharomyces bailii, Zygosaccharomyces rouxii and Saccharomyces cerevisiae). Fermentation process was processed at 37 °C for 240 and 480 min. for lactic acid bacteria and 25 °C for 240 and 480 min. for yeast. Control group was treated with 0.8% (w/v) NaCl solution at same time period. In the fermentation medium, initial number of microorganisms was hold between $4.0x10^6$ and $1.5x10^{10}$ cfu/ml. After the fermentation, fried potatoes (140 °C for 5 min.) were diluted (10% w/v) and homogenized with ultra turrax. The samples were clarified by Carrez solutions and centrifuged at 10000 rpm. As a result the HMF level of fried potatoes was reduced between 63-65% by lactic acid bacteria, 60-100% by yeast at the end of 240 min. The HMF level was decrease under detection limit after 480 min. for all bacteria strains and Z. rouxii and S. cerevisiae.

Keywords: HMF, fried potato, lactic acid bacteria, yeast

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EFFECTS OF THE STORAGE CONDITIONS ON 5-HYDROXY-2-METHYL FURALDEHYDE (HMF) CONCENTRATION IN VARIOUS PEKMEZ

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Pekmez is a traditional Turkish food commonly produced from grape and other kind of fruit juices by evaporation processes both atmospheric and under vacuum conditions. In this study, HMF level of various pekmez was investigated certain time and temperature combination. For this purpose five kind of pekmez were stored at three different temperatures. HMF level of apricot pekmez changed from 133.0 mg/L to 287.1 mg/L (25°C), to 500.2 mg/L (35°C) and to 1060.5 mg/L (45°C) throughout eight mount storage period. HMF level of mulberry pekmez was measured as 88.2 mg/L which increased to 216.6 mg/L (25°C), 710.2 mg/L (35°C) and 1921.5 mg/L (45°C) for the same period. Moreover carob pekmez had most low amount of HMF which was 11.1 mg/L in all the pekmez samples. End of the storage HMF level in carob pekmez was measured as 77.0 mg/L (25°C), 299.5 mg/L (35°C) and 1153.6 mg/L (45°C) respectively. Grape pekmez's initial HMF concentration was 75.5 mg/L which increased to 175.4 mg/L (25°C), 466.1 mg/L (35°C) and 2077.0 mg/L (45°C). Furthermore andız pekmez was determined as most stable sample during the storage period, its HMF content changed from 19.9 mg/L to 28.3 mg/L (25 °C), 55.1 mg/L (35°C) and 280.1 mg/L (45 °C).

Keywords: 5-hydroxymethyl furfural (HMF), pekmez, HPLC

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ADSORPTION OF 5-HYDROXY-2-METHYL FURALDEHYDE (HMF) FROM MODEL SOLUTION AND PEKMEZ USING POLYMERIC ADSORBENT RESIN

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HMF is evaluated as potential hazardous which is formed at high temperature process and during storage period. Aim of the study is decreasing HMF by using polymeric adsorbent resin. Adsorption of the HMF onto a divinylbenzene (DVB)-ethylene glycol dimeth acrylate (EGDMA) copolymer adsorbent was used for this purpose. The effects of contact time and initial HMF concentration were investigated in the pekmez and model HMF solutions. Preparation of DVB-EGDMA polymeric resin was synthesized by suspension polymerization method. The model test system was prepared by dissolving HMF in ultra pure water which concentration was 20 and 40 ppm. The adsorption experiments were preceded in batch reactor and adsorbent concentration was adjusted as 6 mg/mL for both model solutions and pekmez sample. Pekmez samples which have 68 Brix were diluted to 17 Brix concentrations with pure water due to their high viscosity. HMF concentration of the solutions was monitored by using HPLC-DAD. According to the results the DVB-EGDMA co-polymer was demonstrated to be effective to remove HMF from model solution and pekmez. HMF level was reduced 48% in 20 ppm test solution, 38% in 40 ppm test solution and 32% pekmez sample.

Keywords: Adsorption, HMF, Pekmez, Polymeric adsorbent

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MONITORING THE 5-HMF AMOUNT AS AN INDICATOR OF MAILLARD PRODUCTS IN WHEY PROTEIN CONCENTRATE AND SKIM MILK POWDER

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Whey Protein Concentrate (WPC) and Skim Milk Powder (SMP) are used as food ingredient in a widespread manner. These products are sensitive Maillard reaction because of high sugar and protein content. Furfural products of the Maillard reaction are used as specific indicators of the effects of heating treatments and storage conditions on WPC and SMP quality. Therefore Hydroxymethylfurfural (5-HMF) levels were measured in representative samples of them which was stored eight months at three different temperature (25, 35 and 45 ºC) and moisture (2.5, 5, 7.5% for WPC and 5.5, 7.5, 10 for SMP) using Reverse Phase-High Performance Liquid Chromatography (RP-HPLC) with DAD detection during the storage period (in 8 month). The HMF content ranged from 4.25 to 128.56 mg/kg and from 2.07 to 98.23 mg/kg WPC and SMP respectively. Although HMF level of WPC increased together with increasing the moisture content, SMP samples reached the maximum quantity of HMF at 7.5%.

Keywords: 5-HMF, storage, temperature, moisture, milk powder, WPC

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NEW APPROACHES DETECTION OF 5-HMF BY RP-HPLC IN SOME FOODS

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Certain methods of HMF detection such as RP-HPLC, spectrophotometric, micellar electro-kinetic capillary chromatography include the hydrolyzing of protein in order to release the bounded HMF in protein matrix. The hydrolyzing process includes the acid and sample interaction at 100 ºC range from 30 to 60 minutes. Therefore either affinity or separability of HMF to/from some proteins (casein and gluten) was exhibited in this study. Furthermore how effected of HMF level the presence of some substances such as reductive-no reductive sugars, gums, polysaccharides due to high temperature and acidity during the hydrolyzing. After the method modification outcomes were compared with results of existing method by using RP-HPLC with DAD detection. Consequently HMF level of samples were evaluated differently between modified (1.81 ppm) and existing (83.59 ppm) method. HMF amount which was measured by old method was found not independent of the sample amount (83.59 ppm-10% sample, 97.21 ppm-5% sample and 107.09 ppm-2.5%). Moreover HMF was not linked the gluten and bounded the caseine about 10% (stock solution of HMF was 131.89 ppm, after the addition of caseine it decreased to the 116.31 ppm). However it was not released by acid hydrolyzing in solvent media (after the oxalic acid hydrolization-115.53 ppm).

Keywords: bounded 5-HMF, method, protein hydrolyze, carbohydrate, RP-HPLC

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PRODUCTION OF HONEYLOCUST (GLEDITSIA TRIACANTHOS) GUM AND RHEOLOGICAL INTERACTIONS WITH SOME OTHER HYDROCOLLOIDS

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Gleditsia triacanthos is moderately fast growing tree commonly found in America, Middle Europa and Mediterranean countries including Turkey and its seeds are new gum sources and alternative to locust bean gum. Seed of Gleditsia triacanthos is composed of the testa (27%), the embryo (39%) and the endosperm (34%). The endosperm contains different mannose/ galactose ratios galactomannans uses mainly in industry as thickenging and stabilizing agents. In this study, rheological properties and synergistic effect of galactomannans obtained from Gleditsia triacanthos were compared to seven (guar, carragennan, locust bean, xanthan, carboxymethyl cellulose, gum arabic, alginate) hydrocolloids. In rheological study, Herschel-Bulkley and Ostwald de Waale model were considered and it was found that the Herschel-Bulkley model was more convenient. The apparent viscosity, K, and n values for these gums and combination of them with Gleditsia triacanthos seed gum were found between 0.005–0.414 Pa.s, 0.0209–94.026, and 0.0029–0.8584 respectively. As a result of this study, it was observed that Gleditsia triacanthos seed gum has synergic effect between xanthan, carragennan, carboxymethyl cellulose, and alginate respectively.

Keywords: Gleditsia triacanthos, seed gum, synergy, rheology

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SYNERGY EFFECT OF SOME HYDROCOLLOIDS ON RHEOLOGICAL PROPERTIES OF MODEL INSTANT HOT CHOCOLATE BEVERAGE

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In this study, effects of six different hydrocolloids on rheological properties of instant hot chocolate beverage were compared to obtain synergy of the hydrocolloids the most convenient for formulation of instant hot chocolate beverage. The apparent viscosity of samples was changed between 0.006 and 0.219 Pa.s. Consistency index (K), flow behaviour index (n) and r values of samples for Ostwald de Waale Model were found between 0.015–5.261, 0.194–0.874 and 0.977–1.000 respectively. Yield stress (σ_0), K, n and r values of samples for Herschel Bulkley were also found between -0.326–5.327, 0.004–1.544, 0.323–1.076 and 0.987–1.000 respectively. σ_0, n and r values of samples for Bingham Model was changed between 0.152–8.918, 0.006–0.043 and 0.939–1.000 respectively. Most of the samples were fitted to Ostwald de Waale, the others were fitted to Herschel Bulkley and Bingham model. Brix, pH and dry sediment weight per 100 g sample values of samples were changed between 7.70–7.87, 12.205–12.887 and 4.019–8.616, respectively. As a result of this study, it was observed that the highest synergic interaction in model instant hot chocolate beverage was between guar gum and locust bean gum mixture.

Keyword: Instant hot chocolate, gums, synergy, rheology

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PHYSICOCHEMICAL, THERMAL AND RHEOLOGICAL PROPERTIES OF STARCH ISOLATED FROM CHESTNUT *(CASTENA SATIVA)*

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Non-conventional food resources and their value addition have attracted attention in the recent years for their potential use as functional ingredients in food formulations. The chestnut is an edible seeds, which was consumed in Turkey by cooking on the stove or by mixing with sugar. Chestnut has an average starch content of 22.3 g/100g of raw edible portion, whereas raw potatoes contain 15.9 g/100g. This values places chestnuts among the main sources of starch. The objective of the study was to extract starches from raw chestnut and to determine their physicochemical properties such as water binding capacity, bulk density, swelling power, solubility; thermal characteristics such as gelatinization onset, peak and end temperatures and rheological properties. In order to investigate thermal properties using a differential scanning calorimetry, starch isolated from chestnut and water were mixed at different ratios and heated from 20 °C to 100 °C at 10 °C/min. The same samples were loaded into a dynamic controlled-stress rheometer equipped with a 35-mm parallel-plate geometry (1 mm gap) at 20 °C and heated to 100 °C at 10 °C/min. Measurements were performed at 1 rad/s. The physicochemical, thermal and rheological properties make chestnut an excellent alternative to corn and other conventional starches for different applications in foods.

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COMPARISON OF NATURAL FRUIT JUICES IN TERMS OF ANTIOXIDANT CAPACITY

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Consumption of fruits and vegetables has been shown to be effective in the prevention of chronic diseases such as cardiovascular disease and cancer because of their high antioxidant capacity. But different fruit species may have different antioxidant capacity. For this reason, to determine the different antioxidant capacity of 85 natural fruit juice samples obtained from 8 different species commonly consumed in Turkey were analysed for antioxidant activities using the method that evaluates the scavenging of the radical cation of 2,2′-azinobis (3-ethyl-benzothiazoline-6-sulphonate) (ABTS) relative to Trolox C (6-hydroxy-2,5,7,8-tetramethylchromane-2-carboxylic acid), a water-soluble vitamin E analogue. Among fruit juices the highest antioxidant capacities were found in pomegranate juice, black grape juice and quince puree samples (7.4-23.1 mM, 1.7-22.6 mM and 4.1-21.8 mM as TEAC respectively). These were followed by peach puree samples with 3.2-13.0 mM, apricot puree samples with 2.8 - 12.7 mM, orange juice samples with 3.6-4.8 mM and apple juice samples with 1.7-7.6 mM TEAC. On the other hand, antioxidant capacities of pear juice and white grape juice samples (0.5-3.5 mM and 0.6-4.1 mM TEAC respectively) were very low. These findings in fruit juice samples processed at labor scale can not exactly reflect the antioxidant capacity of fruit juices processed at industrial scale but they are important in terms of comparison the fruit species with each other.

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EFFECT OF PRELIMINARY OPERATIONS ON SHELF LIFE OF PACKAGED BLACK OLIVE IN THE ABSENCE OF BRINE

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In this study, the effect of tap water, sodium hypochlorite, Electrolyzed Oxidizing Water (EOW) and Ultraviolet irradiation process (UV) on the surface disinfection and the shelf life at room temperature of packaging of *Gemlik* black olive in the absence of brine were examined. To determine the effects of different processes, chlorine concentration was selected as parameter for washing with sodium hypochlorite and EOW. The distance between the product and UV lamp and UV irradiation time were selected as parameters for UV irradiation. According to results, among the used experimental conditions, the highest efficiency was obtained at 80 ppm chlorine concentration, and 20 min at 10 cm UV treatment. Packaged olives which were treated at chosen conditions were stored in the dark at controlled room temperature (24°C±2). Total aerobic bacteria and yeast and mould counts were assessed to determine efficiency of surface disinfection for each treatment. The microbiological analyses were repeated periodically. Considering the increase of total aerobic bacteria count, the slowest increase was obtained in olives treated with sodium hypochlorite. Results obtained on the last day of the storage pointed out that there was no significant difference ($p \geq 0.05$) among the treatments. In the reduction of yeast and mould count, other treatments were found more efficient than tap water according to the analyses done last day of storage.

Keywords: Electrolyzed oxidizing water, Ultraviolet radiation, *Gemlik*, Olive

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OPTIMAL OPERATING POLICIES FOR THE FREE-ENZYME (SEMI-)BATCH REACTORS IN THE FOOD INDUSTRY - A CASE STUDY FOR THE D-GLUCOSE OXIDATION REACTOR

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Batch and semi-batch reactors are very suitable for conducting enzymatic reactions in a wide range of applicative areas including the food industry. Free enzyme operation can be preferred, by taking advantage of a high enzyme activity leading to high process yields. Such an alternative is suitable when the product separation does not raise special problems, or when the product contamination with the enzyme is not very important. Optimal operation of such reactors is a subject of increased interest, due to the possibility of improving their productivity, with a considerable reduction of enzyme consumption. A concrete example is provided for the case of an industrial reactor used for D-glucose enzymatic oxidation in the rare sugar production lines. By investigating several operating alternatives, including simple batch, batch with intermittent addition of enzyme, or semi-batch with constant or optimal enzyme feeding policy, the study proves how a considerable reduction in the enzyme consumption can be obtained without any productivity or conversion loss. Advantages and drawbacks of the checked operating alternatives are comparatively discussed. The relevant conclusions can be useful for solving similar engineering problems in the food and biosynthesis industry.

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RHEOLOGICAL PROPERTIES OF WHEAT-GRASS MARMALADE

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The wheat-grass is obtained by germination of wheat. It is one of the most widely used supplemental health foods nowadays. It is a source of vitamins, minerals, chlorophyll, and enzymes. In this study, wheatgrass juice was used to produce the marmalade. The rheological behaviour of wheat-grass marmalade with different soluble solid contents (63.8, 61.0, 59.0 and 57.0° Brix) was determined in the temperature range of 10-40°C using a rotational viscometer. The flow characteristics of wheat-grass marmalade were described by the power law, Herschel-Bulkey and Casson models. Shear stress versus shear rate data were fitted to power law model. The power law was the most suitable model describing flow behavior with correlation coefficients (R2) between 0.9893 and 0.9999. Wheat-grass marmalade exhibited a time-independent shear thickening behaviour. The consistency coefficient, m, decreased with temperatures both in the forward and backward measurements. The flow behavior index, n values, were affected by temperature.

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EFFECTS OF THE CONCENTRATION TREATMEANTS ON SAGE (SALVIA FRUTICOSA) EXTRACT

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The aim of this study was to produce concentrated sage (Salvia fruticosa) extract by using multi-step membrane process and determine total phenolic content (TPC), total flavonoid content (TFC), antioxidant capacity and phenolic composition of the extracts sampled from each step of the applied treatments. The initial total soluble solids (TSS) of the sage extract, obtained by one step hot water extraction (raw extract), was determined as 0.9 °Brix. This value was then increased to 4.4 °Brix by reverse osmosis (RO; preconcentrated extract) and subsequently to 32.4 °Brix by osmotic distillation (OD; concentrated extract). The TPC of the extracts were found to be 2.656±0.100, 9.383±0.012 and 77.050±0.495 mg (GAE)/mL and the TFCs were determined as 2.491±0.039, 7.746±0.024 and 64.744±3.349 (CEQ)/mL for the raw, preconcentrated and concentrated extracts, respectively. Antioxidant capacities for the extracts and Trolox were expressed by IC50 values, which were calculated as 7.364±0.113, 2.347±0.092, 0.264±0.008 mL/mg DPPH, and 0.172±0.005 mg/mg DPPH for the raw, preconcentrated, concentrated extracts and Trolox, respectively. The phenolic compounds, identified in the extracts, were apigenin, rutin trihydrate, hesperedin, luteolin, camferol, cafeic, p-coumaric and ferulic acids. The study showed that the sage extract can be successfully concentrated by using RO and OD. However, the TPC and TFC of the extracts decreased slightly (about 10%) during RO treatment.

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BIOENERGY PRODUCTION FROM FOOD INDUSTRIAL WASTES

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Nowadays, the utilization and development of renewable energy sources has been come into the limelight, and the environmental awareness is also became a momentous principle in industrial practice. For instance the development of appropriate waste handling is necessary not only for reducing of waste annulment costs but for enhancing the profitable of processing. The wastes and by-products of food industrial technologies are suitable for bio-energy manufacturing because of high organic matter content. Digestion is the eldest technology for waste stabilization and however by controlled anaerobic decomposition a high value and marketable gaseous can be produced.
In our work the possibility of biogas production were investigated from dairy - and meat processing wastes and by –products. The examined row materials were: sweet and acidic whey, sewage sludge, pig manure.
Our aims were to measure the biogas and methane production of several materials and examine the applicability of potential gas product enhancing pretreatments i.e. acidic hydrolysis, microwave heating. In the case of sewage sludge, sweet whey and acidic whey the acidic thermal and microwave pre-hydrolysis seem to be promising, because after pretreatment the biogas production increased about 10-50% and the methane/biogas ratio was also enhanced.

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DEVELOPMENT OF COMPUTER VISION SYSTEM FOR QUALITY EVALUATION OF CHICKPEAS

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Chickpea is one of the most important legumes harvested in around the world. Pricing of chickpea is based on grain size and defected grain ratio in Turkish standards. Three types of defects are searched. These defects are being color defected, wrinkled and broken. The objective of this study was to design and implement a computer vision system (CVS) integrated with artificial neural networks (ANN) for quality evaluation of chickpeas based on size, color and surface morphology. Length, width and volume of the samples as well as color properties and surface characteristics were determined by using the developed system, and results were validated. High correlations were found between the results from ANN-integrated CVS and those obtained from experiments by caliper or inspector. Overall correct classification ratios were determined as 95.4%, 87.6% and 96.0% for color, surface morphology and shape evaluations, respectively. The results indicate that the developed system can be used successfully as rapid and reliable method for quality evaluation of chickpeas since it only takes about 1 min for whole analysis and achieves very high accuracy in classifications.

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OSMOTIC DEHYDRATION OF APRICOT USING SALT-SUCROSE SOLUTIONS

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Fruit drying is a well known process mostly used for preservation of fruits. Osmotic dehydration of apricot slices were carried out in three different salt-sucrose concentrations and four different temperatures. Also three different weight ratios of solution to sample were conducted to one set of experiments. The dehydration curves were constructed using Peleg's model. Increasing the solution volume increased the mass transfer rate and hence the solid gain increased rapidly. Increasing the volume of osmotic media caused an increase in overall mass transfer but a 'solution to sample' ratio of 5:1 gave the best product quality. The best temperature and concentration that had a high water loss to solid gain ratio and an acceptable taste were 40˚C and 5%, respectively.

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FOOD COATINGS BY ELECTROSTATIC ATOMIZATION

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Food quality and shelf-life is strongly affected by coatings, which may co-determine the exquisite taste. It creates a protective moisture barrier to maintain the crispiness of the products. There is a great demand for efficient coating methods for foods and electrostatic coating holds promise owing to the evenness in coating, high transfer efficiency and it produces less dust and waste compared to conventional non-electrostatic powder and liquid spray coating. However, application of electrostatic coating for production of food coatings is not widely spread. Depending on the type of coating formulation a different coating electrostatic technology can be applied. For liquids, electrohydrodynamic (EHD) atomization is the method of choice which utilizes electrical forces to overcome the surface tension and break up a falling film into very small droplets. Various process parameters such as spraying mode (flow rate), and liquid properties (conductivity) were investigated, and droplets of approximately 50 μm can be produced, which provide a thin ($\pm$20 μm) and homogeneous coating layer. Further, it was noted that the thickness of the coating layer varies with the wettability of the target surface. The efficiency of coating is determined by interplay between process conditions, coating composition, and surface properties.

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A RESEARCH ON EMULSIFYING PROPERTIES OF NANO FIBERS

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Dietary fibers have worldwide importance recently due to their health claims. In this research, the effects of dietary fibers on food emulsion stabilities, particle size distributions under light microscope and rheological properties were studied. Sizes of orange skin (zest) and corn fibers were reduced to nanometers and used in fine emulsions containing 3% whey protein isolate and various amounts of oil. These model emulsions included 1%, 2% and 3% of fiber, and between 20 and 50% of oil. According to the results, increasing the amount of fiber at constant oil percentage made phase inversions of emulsions more difficult and formed more stable structure. While oil content was constant, elastic (G') and viscous (G'') moduli of groups including 3% fiber were found higher than those of the other groups when using same fiber material. Light microscope analysis showed that addition of fiber into model emulsions formed tighter structure of oil droplets and caused a 3-D form. This study also indicated that fiber addition into food emulsions improve emulsion properties and stability. These foods can also have health claim due to their fiber content.

Keywords: Nano fiber, emulsion stability, rheology

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MATHEMATICAL MODELLING FOR COOLING PROCESS IN HARD CANDIES

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This paper presents unsteady numerical simulations of the cooling process of hard candies which is one of the most critical factors on the desired product quality because it can lead to hard candies with splinters, broken, misshapen or sticky between them. Precisely, one dimensional mathematical model of the transient heat transfer on hard candies is developed to understand the effect of the main operating conditions (residence time, candy size and cooling air velocity) on the radial temperature distribution. gPROMS package is used for the system modeling and simulation. The proposed model involves reliable model parameters to compute the thermal-physical properties of product and therefore it can be used as a useful tool in order to determine the optimal equipment design and operating conditions to ensure a high quality of the final product. Simulation results are presented and the influence of the main model parameters on the cooling process is discussed in detail. The simulation results show that the residence time, the cooling air velocity and the candy radius play an important role on the cooling process and the product quality, revealing an important trade-offs between the heat transfer coefficient, the residence time and the radial temperature difference.

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EFFECT OF PULSED ELECTRIC FIELDS ON MASS TRANSFER IN SUGAR BEET DURING EXTRACTION OF SUGAR

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Effect of PEF pretreatment at 1kV/cm and 2kV/cm, 8 F, 1 to 20 pulses on mass transfer of sugar beet cossetes by determination ofμ sugar leaching and ion release during immersion of samples in tap water (0.5 mS/cm) at room temperature were evaluated and compared with untreated samples C in same conditions. The brix and°and thermal processing 50 and 75 conductivity measured as mass transfer index in solution around the untreated and treated beet sugar when subjected by two PEF field conditions (1&2kv/cm, 8μF, 20 pulses)The extraction carried out during 90 min. The results showed that F, 1 to 20 pulses) is anμboth PEF pretreatment at 1kV/cm or 2kV/cm, (8 appropriate method for permeabilization of cells and consequently facilitate the mass transfer. Moreover, increasing the pulse number as well as field strength during PEF pretreatment resulted higher leaching of sugar (measured as brix value) and ions (measured as electrical conductivity). The ions and brix of raw juice are increased when increasing the the extraction time and there are significant differences between brix and conductivity solution of treated sugar beet using field strength 1kv/cm and 2kv/cm in constant condenser capacity and pulse numbers. In addition, when samples pre-treated by PEF and subsequently C lead to nearly similar°immersed in tap water at moderate temperature of 50 C couldn't more assist to release of°mass and the moderate temperature 50 C°sugars and ions. However, treated samples using high temperature75 individually significantly increased the brix and conductivity amount of syrup of surrounded samples in height.

Keywords: Pulsed electric field, Mass transfer, Sugar beet , brix , conductivity

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MIXING EFFECT ON THE ENERGY DISTRIBUTION THROUGHOUT THE COUSCOUS MACARONI IN A MICROWAVE OVEN

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The effect of mixing on energy distribution throughout the couscous macaroni placed in a suitable pot in a microwave oven was investigated in this study. By using a home type microwave oven, the samples were wetted by cobalt chloride hexahydrate and with and without a previously designed mixer, the samples were put in the oven for a power level range of 10-100 %, and a time range of 60-120 seconds. The change in the color in different positions which indicates the energy distribution was measured by obtaining the L*, a* and b* values. Without using mixer, all the color values followed a sinusodial path by changing position from center to the wall of the pot, whereas after mixing, the path became more linear and constant. As a result of statistical analysis of the obtained color values, the change in these values by position became statistically insignificant (P>0, 05), however by time and power, it became significant (P<0, 05). These indicated that the energy was distributed homogenous enough that any change in position did not effect the color value, although changes in power level and time were important.

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TEXTURAL AND PHYSICAL PROPERTIES OF COOKIES BAKED IN NATURAL AND FORCED CONVECTION OVENS

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Convective oven cookie baking process was investigated for the determination of textural and some other physical properties during a complete baking process. Hardness and fracturability values were measured using a texture instrument (TA-XT Plus) for the cookies baked at three different temperatures (165, 180, 195 °C) under natural and forced convection conditions. Beside, moisture profiles and water activity values for cookies were obtained. Also, the change in thickness and surface color were determined. Hardness and fracturability were related to average moisture content and thickness of cookies. With the increase in baking temperature and time, the cookie hardness value increased. But, no further change in that value was observed after the formation of surface crust. On the other hand, fracturability values did not show a definite difference with baking temperature and time. The reduction in the moisture content of the cookies accompanied an increase in hardness values. As the thickness increased during baking, as a natural expansion for bakery goods, the hardness value was observed to increase. The color of the cookies as Hunter L, a, b values was determined and the "a" value was observed to increase with time, showing the degree of bakeness.

Keywords: cookie, baking, natural, forced convection, texture, hardness, fracturability

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OPTIMIZATION OF THE INGREDIENT LEVELS IN MEATBALL PRODUCTION USING ARTIFICIAL NEURAL NETWORKS

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The overall quality of meatball was effected by the levels of ingredients used in the production. In this respect, fat, water and textured soy protein (TSP) have significant effects on shrinkage, fat loss and moisture loss of the meatball after cooking. In this study, standard two-layer feed-forward artificial neural networks (ANNs) were developed to predict the optimum levels of water, fat and TSP in meatball production to obtain minimum shrinkage, fat loss and moisture loss after cooking. The ANNs were trained using Levenberg-Marquardt optimization with a data file composed of: values of water level (10-20%), fat level (15-30%) and TSP level (3-9%). The output variables of the ANNs were shrinkage, fat loss and moisture loss, individually. It was found that the predictions of the ANN models fit the experimental data. The performance of the ANNs was evaluated using mean square error (MSE) and regression (R) analysis. The R values for testing data of shrinkage, fat loss and moisture loss were 0.984, 0.998 and 0.998, respectively.

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NANOTECHNOLOGY APPLICATIONS IN FOOD

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Nanotechnology is defined as a field of science bringing together science and technology in order to control materials at the atomic and molecular scales below 100 nanometers. Nanotechnology applications consist of imaging, modeling, controlling and changing of all biological and non-biological structures. In recent years, nanotechnology applications in food industry have focused on the improvement of nutritional health benefits of food, its preservation or its release in the target organ or tissues. Nanotechnology and food engineering applications cross roads in many applications in the provision of food security, the development of new materials such as biosensors in order to detect pathogens and in the preservation of the environment. Nanotechnology applications in food also include the design of devices that are able to follow all the processes a food material goes through until it is purchased by the final customer, or the authentication of the transport of functional ingredients to the target cells through the development of intelligent transport or release systems using encapsulation. Nanotechnology also has an important role in the production of super-foods or in the design of intelligent food-systems in the food industry. Besides, through changing the surface properties of the taste constituents in food, it might change the perception of the quality of food drastically through the targeted transport towards taste sensor cells in the taste buds.

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EFFICIENCY OF SOAPWORT EXTRACT POWDER PRODUCTION IN SPRAY DRYING

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In this work, the aim was to determine the effect of spray drying parameters, such as feed soluble solid concentration, air inlet temperature and air outlet temperature, on the soapwort extract powder production efficiency and main quality characteristics as total saponin content and foam volume. Soapwort root extract was obtained after sequential extractions of the soapwort roots by boiling with water. Prior to drying process, maltodextrin was added to extract and spray drying was applied to produce soapwort extract powder. Total efficiency was determined on weight basis, saponin content analysis was conducted by gravimetric method and foam volume measured by volumetric method on the obtained soapwort extract powder. According to the results of the study, efficiency values varied between %78 and %97 on the other hand spray drying operation didn't affect the total saponin content, that is a very significant ingredient for tahin halva (Turkish halva) and pasha delight (Turkish delight) production, and foam volume. In conclusion, the optimum soapwort root extract drying parameters were determined as feed soluble solid concentration 15.0±0.0°Bx, air inlet temperature 110.3±0.5 °C and air outlet temperature 79.7±0.5 °C by using respond surface methodology.

Keywords: powdered soapwort root extract, spray drying, efficiency, saponins

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MOISTURE SORPTION ISOTHERMS AND SHELF LIFE ESTIMATION OF MICROENCAPSULATED EGG POWDER

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Recently there has been an increase in demand of dried whole egg products in the food industry against to traditional liquid eggs for handling and hygienic considerations. The spray drying itself leads to many changes in egg properties like the sorption behaviour. Although spray drying could induce the oxidation of fat fraction of whole egg, stability of oxidation of egg powder can be increased with microencapsulation techniques. In this study, moisture adsorption isotherms of spray dried microencapsulated and bare egg powders were determined at 25°C using the standard, static-gravimetric method. Experimental data were fitted to the GAB model. The shelf-life of egg powders were predicted based on the relationship between permeability coefficient of the packaging material and moisture adsorbed by the powder determined by the GAB equation. Hygroscopicity of powders was also determined. GAB equation gave a satisfactory prediction of the adsorption equilibrium moisture content of spray dried egg powders. The longest shelf life of microencapsulated egg powder with gelatin in ALPE pouches at 20°C and 50% RH storage conditions was determined as 427 days based on moisture adsorption behaviour. Adding of gelatin improve the shelf-life of egg powder. Egg powders containing lactose have the lowest moisture uptake, due to hygroscopicity results.

Keywords: moisture adsorption isotherm, microencapsulation, egg powder, shelf life, spray drying

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STORAGE EFFECT OF MALAYSIAN CASSAVA (MANIHOT ESCULENTA) ROOT TUBERS ON THE QUALITY OF CHIPS

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Effect of storage time for tubers of cassava (Manihot esculenta) roots on hardness and color of cassava chips was determined. After harvesting, cassava roots were stored up to 5 days in ambient temperature (27oC; 70-80%) with adequate ventilation. The tubers were sliced to a thickness of 1 mm and cut into an oval shape (48 mm minor diameter x 50 mm major diameter). These slices were deep-fried individually at 180°C for 45s using 2L of vegetable oil. The hardness of chips decreased from 0.59 to 0.31N. Lightness in color of the chips decreased from 29.13 to 23.17, while the hue angle decreased from -88 to 85 with increasing storage time. The result indicates that there was a gradual loss of quality in fried cassava chips when the tubers were stored after harvesting.

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ISOLATION OF ANTHOCYANINS FROM BLACK CARROT WITH SOLID PHASE EXTRACTION TECHNIQUE

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The aim of this study was, to synthesize and characterize the various polymeric adsorbents which are used in recovering of black carrot anthocyanins by Solid Phase Extraction technique. In this context, acrylic and methacrylic monomers were polymerized with free radical polymerization technique. In the stage of synthesis we worked with four different cross linker monomers which are EGDMA, PEGMA-330, PEGMA-550 and PEGMA-700 and one kind of diluent (Tol). Firstly the type of cross linker was optimized and worked with four different monomer/cross linker and four different monomer/diluents ratios. Characterizations of the polymeric adsorbents were designed by size distribution, polymerization yield, Scanning Electron Microscope (SEM) images and swellability ratio in water and ethanol. In order to determination of best production condition of polymeric adsorbents were tested in model batch system. The number of TS-14 was demonstrated the best performance, according to batch model system experiments The anthocyanins of the black carrot were recovered successfully from carrot juice by using pack bed adsorption column system which is prepared with TS-14. At the end of the study; 3,01 g colour components were obtained from 1 L red carrot juice.

Keywords: Solid phase extraction, anthocyanins, adsorption

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MODELLING ADSORPTION IN PRODUCTION OF GRAPE SYRUP

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Grape syrup is one of the grape products which are produced both traditionally and industrially in Iran. This research intends to determine the precise amount of the soil used for producing the syrup and to change the traditional process into a semi industrial one. We also want to achieve the best optimum parameters to promote the quality of the final product. Our experiment was performed with the grapes produced in Sheshtamad (Sabzevar) and the soil gotten in Sheshtamad (Sabzevar). Three ratios of used soil including are 20, 25 and 30 percent in three experiments. Finally resulted in three treatments. Calcium Carbonate, an alkalin that can negate Tartaric Acid in grape syrup, is the most important component in this soil. Calcium Carbonate reduces the grape syrup acidity and this make the grape syrup, sweet. The amount of $CaCo_3$ in this soil was about 34.5 %. Physicochemical experiments (based on acidity, pH, density, reduced sugar, the whole sugar, sucrose) were performed on final product. According to the adsorption relations and these adsorption models (Longmuir, Freundlich and linear), we resulted that the lowest RSME and EMD and the highest valve R2 related to 30% ratio in linear model. The 30% ratio of the soil had also the lowest amount of acidity. Finally according to linear model and 30% ratio of used soil, we need 4.5 Kgs soil and 20 Kgs grapes to achieve grape syrup with the best quality.

Keywords: Grape syrup, modelling, adsorption, physicochemical properties

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PREDICTION OF FLOUR MIXING RATIO ON DRIED BUCKWHEAT NOODLES USING EXCITATION-EMISSION MATRIX

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Buckwheat noodles are one of Japanese traditional foods. They are made from buckwheat flour, thickener and water. Wheat flour is the most popular as thickener. Thickener is required less than 60% of buckwheat noodles in Japanese regulation. However, there is a lot of misleading description on its package because wheat flour is cheaper than buckwheat flour. Objective of this study is to develop the nondestructive and quick method for prediction of the flour mixing ratio using excitation-emission matrix(EEM). EEM is three-dimensional fluorescence data which consists of excitation wavelengths, emission wavelengths and fluorescence intensities. EEM represents unique characteristic based on each constituent. Various commercial dried buckwheat noodles were collected and cyclone sample mill was used to prepare its flour. EEM measurement of flour sample was carried out by the fluorescence spectrophotometer. PLS regression model was applied to the EEM data. Effective wavelength for excitation and emission were also studied to achieve quick measurement. It was found practical prediction is available by EEM measurement and reasonable mathematical model.

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ISOTOPIC ANALYSIS FOR DETECTION OF FOOD ADULTERATION

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Recently, for food authenticity assessment and origin control, stable isotope analyses have been used increasingly. Isotopic analyses methods are based on the measurement of stable isotope contents of a product or of a specific component. For this purpose SNIF-NMR and IRMS, capable of determining the exact proportion and location of specific isotopes within a food sample, are the most sophisticated and specific techniques. Applications of NMR spectroscopy to authenticity control of food products are limited to liquid samples. For this purpose using multivariate analysis are also required for the discrimination of adulterated and pure foods. A significant contribution to the analytical techniques for food authentication is made by the SNIF-NMR method which is used to measure the site specific natural isotope fractionation in a variety of organic compounds. IRMS is another isotopic analysis technique that can distinguish chemically identical compounds based on their isotope content. The ratio of stable isotopes of elements that constitute almost all biological material, 13C/12C, 15N/14N, 18O/16O and 2H/1H can be determined. The stable isotopic data are expressed in the delta (δ) notation as the per mil (‰) deviation of the isotope ratio of a sample relative to that of a standard. Isotopic analyses have a wide range of application in food and drink quality and adulteration studies. Such as geographic origin of food, presence of foreign food or additives and growth year of products can be determined with isotope analyses. These analyses are mostly applied for authenticity control of food products such as fruit juice, wine, vinegar, olive oil and honey.

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EFFECT OF DIFFERENT EXTRACTION METHODS ON YIELD, FATTY ACID CONTENT AND ANTIOXIDANT PHENOLIC COMPOUNDS OF PERSIAN WALNUT OIL

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The objective of this study was to compare the effects of three oil extraction procedures, namely hexane, chloroform/methanol and cold-press on oil content, fatty acids profile and bioactive components in the walnut oil. Result showed that the chloroform/methanol extracted oil had higher amounts of oil than other investigated methods. The oil content was found 34.93%, 55.85% and 62.3% for cold-press, hexane and chloroform/methanol methods, respectively. Also, fatty acids composition was not influenced by extraction method. The major fatty acids were linoleic acid (50.11-50.18%), followed by oleic acid (24.83-25.13%), linolenic acid (12.04-12.07%) and palmitic acid (8.81-8.84%).Total phenolic content for hexane, chloroform/methanol and cold-press extracted oil were 0.17, 0.22 and 0.2 mg gallic acid/g oil, respectively, while the corresponding values for ortho-diphenol content were 0.32, 0.37 and 0.35 mmol ortho-diphenols/kg oil, respectively. Moreover, antioxidant capacity evaluated through the 2,2-diphenyl-1-picrylhydrazyl radical assay and EC50 value. The results showed that the highest percentage of inhibition was found for extracted oil by chloroform/methanol solvent. However, no significant differences in these parameters were observed between the chloroform/methanol solvent and cold press methods.

Keywords: Walnut oil, Antioxidant activity, Lipid profile, Phenols, Oil extraction

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EFFECT OF GLUCONO-DELTA-LACTONE ON PROPERTIES AND ACCEPTABILITY OF SOM-FUG, A THAI FERMENTED SAUSAGE, DURING REFRIGERATED STORAGE

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Glucono-delta-lactone (GDL) is an acidulant used for lowering pH in fermented foods including Som-fug. Generally, Som-fug can be stored in a refrigerator for 7-10 days. During storage, a number of chemical reactions generally occurred and seemed to alter the characteristics of Som-fug. Therefore, the changes in properties and acceptability of Som-fug added with and C) were studied. During°without 0.25% GDL during 15-day refrigerated storage (10 storage, samples were analyzed for lactic acid bacteria (LAB), pH, total acidity, total volatile base nitrogen (TVB-N), weight loss, texture, color and acceptability. LAB of control increased slightly within 12 days of storage with a marked decrease at day 15 ($p<0.05$). With increasing time, pH of both samples decreased gradually ($p<0.05$) while the weight loss increased and the rate of increase was more pronounced in treated Som-fug ($p<0.05$). The greater TVB-N was noticeable in control compared with treated sample ($p<0.05$). Treated Som-fug showed a greater decrease in cohesiveness and springiness during storage ($p<0.05$). Total acidity of both samples increased with increasing storage time. A marked decrease in acceptability was observed in control. In conclusion, Som-fug added with GDL can be kept under refrigeration up to 15 days with slight changes in total quality.

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EVALUATION OF REPLACEMENT OF VINEGAR BY FERMENTED CHEESE WHEY IN THE FORMULATION OF MAYONNAISE SAUCE

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Mayonnaise is the most popular sauce all over the world. The quality properties of mayonnaise are because of its taste, aroma, and consistency which depend directly on the proportion of the ingredients used in its formulation. The nutrition value of mayonnaise may be improved through using fermented cheese whey (FCW) in its formulation. Moreover, FCW can improve viscosity and consistency of mayonnaise and its shelf life. Additionally, using FCW is a good strategy to make use of an otherwise wasted liquid. It can prevent the pollution of the environment. In this study, cheese whey having been fermented by some chemical tests before and after fermentation were used to determine the pH, acidity, lactose and protein percentage in the whey. The obtained FWC then, was mixed with acid acetic with five proportions of 0, 25, 50, 75, 100.These mixtures were then used in the formulation of mayonnaise. The five formulations were analysed by some chemical sampling to determine the pH, acidity, lactose, dry matter and protein percentages. Finally, Sensory Evaluation was used to select the best formulation. The formulation with 25% FCW was the best one in terms of taste, aroma, consistency and color.

Keywords: mayonnaise sauce, cheese whey, formulation

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OPTIMIZATION OF EMULSIFIER GEL FORMULATION FOR IMPROVEMENT OF FLAT BREAD IMAGE PROPERTIES

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The influence of Sodium stearoyl-2-lactylate (SSL) and propylene glycol (PG) addition (0 - 0.5 g/100g) to emulsifier gel formulation on the crumb and crust characteristics of Barbari bread in order to optimization of them were evaluated. The results showed that addition of SSL caused increment in the crumb and crust L* and cell density. The a*, b*, average cell size and porosity of bread crumb decreased by increasing SSL. PG had increasing effect on b* of crumb and decreasing effect on L* of crust. However, no significant difference was observed in a* and b* of crust. The results for optimization using central composite design suggested that a mixture containing 0.5 g/100g of SSL and 0.5 g/100g of PG could be a good improver gel to achieve the best characteristics.

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EFFECT OF GEL IMPROVER COMPONENTS ON SENSORY AND QUALITY PROPERTIES OF BARBARI BREAD FORTIFIED WITH SOY FLOUR USING RESPONSE SURFACE METHODOLOGY

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The influence of diacetyl tartaric acid esters of monoglyceride (DATEM) and propylene glycol (PG) addition (0 - 0.5 g/100g) to emulsifier gel formulation on sensory and quality characteristics of Barbari bread fortified with soy flour and in order to optimization of them were evaluated. The results showed that addition of DATEM caused improvement in the sensory characteristics such as upper surface properties, firmness, cavity and porosity, chewability and overall quality and also increment in quality properties such as specific volume, moisture content and water activity. PG had increasing effect on upper surface properties, firmness, chewability but texture firmness, moisture content, water activity were decreased. Sometimes, negative quadratic and interaction effects of gel components were determined. However, no significant difference was observed in form and shape, bottom surface properties, odor, flavor and taste and of bread as a consequence of additive addition. The results for optimization using central composite design suggested that a mixture containing 0.36 g/100g of DATEM and 0.5 g/100g of PG could be a good improver gel to achieve the best characteristics.

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USAGE OF C-PHYCOCYANIN PRODUCED BY CYANOBACTERIA

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There is an increasing demand for natural pigments because of toxic effect of several synthetic pigments. The characteristic coloration of the phycobiliproteins, make them attractive to food and cosmetic industries as natural pigments. The cyanobacteria are excellent potential sources of phycobiliproteins, because its 20% of the dry weight is c-phycocyanin. Among the phycobiliproteins, c-phycocyanin is the most important natural blue pigment for the food industry because of its intense color, its high solubility in water, and its stability to change in pH. In additional it is nontoxic and noncarcinogenic. It is used in coloring many food products such as chewing gums, dairy products, ice creams, jellies, soft drinks, desserts, sweet cake decoration and cosmetics. Recent studies have shown their applicability as natural dyes in food and cosmetics, replacing the synthetic colourants. A disadvantage of c-phycocyanin, however, is its low thermal stability. Despite its lower stability to heat and light, c-phycocyanin is considered more versatile than gardenia and indigo, showing a bright blue color in jelly gum and coated soft candies. At present, most c-phycocyanin is commercially produced from the freshwater cyanobacterium Spirulina platensis. The commercial use of c-phycocyanin is expected to increase markedly in the future for pharmaceuticals and coloring additives.

Keywords: Phycocyanin, food industry, cyanobacteria

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EFFECTS OF ROSEMARY (ROSMARINUS OFFICINALIS) EXTRACT ADDITION ON OXIDATIVE STABILITY OF FRIED SEA BREAM (SPARUS AURATA) DURING CHILL STORAGE (4˚C)

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The effects of rosemary extract addition (%2, %2. 5 and %3) on oxidative stability of fried sea bream (Sparus aurata) during chill storage (4±1˚C) period were investigated. Sea bream fillets (20 fillet x 75gr =1500gr) were treated with 1L of 20gr, 25gr or 30gr rosemary extract L-1 distilled water for 1-2min. Each of these groups (%2, %2. 5 and %3) including the control group were then fried in sunflower oil at 180˚C for 4 min. One of each fried samples were analyzed immediately, and the other samples were assessed in terms of sensory and chemical quality indices over the period of 7 days of chill storage at 4˚C. The highest FFA, PV and TBA values were obtained from the control group (0. 40% oleic acid, 2. 36 meq/kg and 2. 59 mg MA/kg, respectively) at the end of the storage period. However, the treated samples with rosemary extract (%2, %2. 5 and %3) showed lower FFA (0. 30, 0. 23 and 0. 24% oleic acid, respectively), PV (1. 01, 0. 89 and 0. 89meq/kg, respectively) and TBA (2. 08, 1. 57 and 1. 16 mg MA/kg, respectively) formation. Similarly, it was recorded that the additions of rosemary extract have positive effect on sensory quality (especially odour, flavour and texture) of fried sea bream fillets. According to sensory assessment, the lowest overall sensory acceptability (5. 08) was obtained for fried sea bream fillets without rosemary extract (the control), although the treated groups (%2, %2. 5 and %3) were still acceptable (6. 33, 6. 67 and 7. 58, respectively) at 5 days of chill storage.

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THE IN- VITRO INVESTIGATION OF ALPHA LIPOIC ACID SUPPLEMENTATION ON PROTEIN QUALITY OF SEA BREAM (SPARUS AURATA), ANCHOVY (ENGRAILUS ENGRASICHALUS) AND ATLANTIC BONITO (SARDA SARDA)

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In this study, the effect of alpha lipoic acid as an antioxidant on protein quality of sea bream, anchovy and Atlantic bonita oxidized with Fe+2 catalyzed oxidation system were investigated. Protein carbonyl (nmol carbonyl/ mg protein) and sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) were used to determine protein oxidation and denaturation, respectively. As a result of this study, a significantly decrease in the amount of protein carbonyl was obtained with 1% alpha lipoic acid supplementation for sea bream and 0.5% alpha lipoic acid supplementation for Atlantic bonita. In anchovy, the amount of protein carbonyl decreased with 0.1% and 0.5% alpha lipoic acid supplementation. However, 1% alpha lipoic acid supplementation did not effect on the amount of protein carbonyl. Results from electrophoresis analyses indicated that the alpha lipoic acid did not show a good antioxidant property for these species and also it showed prooxidant activity in the dark muscle of fish when it was used of the ratio of 1%.

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FOOD ADDITIVES USED IN FISHERY PROCESSING TECHNOLOGY AND DIFFERENCES ON LEGAL RESTRICTIONS

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Today, importance of additives used in developing food sector increase rapidly. Every passing day, additives have being developed which have different properties and using for different proposes. Using of food additives has become common so as to improve texture, taste, flavour and increase the storage period of foods, to prevent from spoilage. In this way, different foods had first day's organoleptic, physical and nutritive value to different areas can be achieved. Various laws were prepared after additives had been used for other purposes by different sector. These laws prevent using of an additive for adulteration and cover a poor quality food. Usage amount of additives have been limited; thereby, have been tried to reduce toxic effect. Codex Alimentarius Commision (CAC) was established for restricting and controling the additives used in world food industry. In our country, using additives were limited with Turkish Food Codex (TFC) comunique about food additives except colorants and sweeteners published in the official newspaper on May 2008. The purpose of this review, to classify additives allowed to use in fishery processing technology and to draw attention to differences legal limit both CAC, EC and TFC.

Keywords: Food additives, fishery products, legal restrictions

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SUPERCRITICAL CARBON DIOXIDE EXTRACTION OF PROANTHOCYANIDINS FROM GRAPE SEEDS

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In this study the antioxidant substances, proanthocyanidins, from grape seeds were extracted with supercritical carbon dioxide (CO_2). Supercritical CO_2 extraction was preferred due its minimum usage of chemical substances and the proanthocyanidins are not affected from air and light. CO_2 was selected as a supercritical fluid because it has a low critical temperature (304.1 K) and moderate pressure (7.28 Mpa) so that the antioxidants would not be degraded from temperature. A co-solvent like ethanol, methanol or acetone should be used with supercritical CO_2, because of its non-polar nature; polar substances like the proanthocyanidins could not be extracted with CO_2. Pressure, temperature and percentage of ethanol were changed during the extraction procedure. After extraction the proanthocyanidins (+-catechin, (-)-epicatechin, procyanidin B1 and B2, epigallocatechin, gallic acid, epigallocatechingallate and epicatechingallate) were analysed with RP-HPLC with a gradient programme. According to the results increasing the percentage of ethanol, increased the extracted amount of proanthocyanidins. While increasing the pressure increased the extracted amount, increasing the temperature did not affect the extracted amount of proantocyanidins significantly.

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PROBIOTIC EFFICACY AND PROBIOTIC CARRIER FOOD SYSTEMS

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The whole concept of probiotics is not new. The history recording the beneficial properties of live microbial food supplements such as fermented milks dates back many centuries. Their health benefits have been long known; Hippocrates and other scientists in the early ages considered fermented milk not only a food product but a medicine as well. Food substrate and diet are carriers for the delivery of probiotics to the human body. In addition, foods help to buffer the probiotic bacteria through the gastrointestinal tract, regulate their colonization and contain other functional ingredients to alter their functionality and efficacy. Gastric acid, juices and bile tolerance, adherence to gastrointestinal epithelium and the acid production of probiotics are affected by the food ingredients used in probiotic delivery. For example, the combination of prebiotics along with probiotic bacteria has potential to provide a complete food for maximum health benefits. In terms of the growth and viability of probiotic bacteria in retail products, dairy products are excellent vehicles for the transfer of selected probiotic strains to humans. However nowadays, there is an increasing trend towards using probiotic in different food systems despite its original sources, such as in capsules. Therefore, selection of suitable food system to deliver probiotics is a critical factor that should be considered in developing functional probiotic food. This presentation gives information related to the effect of processed dairy products on functional efficacy of probiotics and discusses the importance of food itself.

Keywords: Probiotic efficacy, carrier food systems, functional foods

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P695

DETERMINATION OF PHYTOESTROGENS IN SOY-BASED NUTRITIONAL SUPPLEMENTS VIA ULTRA PERFORMANCE LIQUID CHROMATOGRAPHY

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Concerning their promoted health protecting benefits, a multitude of isoflavone containing, commercially retailed nutritional supplements has been widely emphasized as a complementary alternative to hormone replacement therapy, promising safe remedies for alleviating menopausal symptoms. However, prevalent nutritional information tend to label solely the total isoflavone contents, whereas the specific isoflavone conjugates as well as the applied calculation basis, whether referring to bioactive aglycones or the conjugated glycoside forms, often remain unclear. Hence, commercially available soy-based nutritional supplements were characterized via a newly established ultra performance liquid chromatography (UPLC™) method, on both their native conjugated isoflavone spectra subsequent to direct extraction, as well as on quantitative amounts derived as total aglycones after enzymatic hydrolysis utilizing Helix pomatia juice. Qualitative isoflavone profiles after solvent extraction disclosed primarily conjugated forms, especially glycosides, as the predominant isoflavonic constituents throughout the majority of analyzed supplements, whereas only few samples indicated the more bioavailable free aglycones as prevailing compounds. Moreover, the robust quantification as total aglycones subsequent to enzymatic hydrolysis unexceptionally yielded negative deviations referring to the labeled specifications, thus implying that stated amounts were typically calculated on basis of the high molecular isoflavone conjugates. Hence, incorporation of those higher molecular weights consequently yielded in considerable higher virtual isoflavone contents. As consumer decisions are basically relying on the labeled content itself, a uniform basis for calculating the stated isoflavone amounts seems inevitable to facilitate a consumer friendly comparability of these nutritional supplements.

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P696

QUALITY CHARACTERISTICS OF SUGAR FREE SPONGE CAKES FORMULATED BY SUCRALOSE

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Sucralose is a nonnutritive sucrose derivative that has been described as a high intensity sweetener with little or no aftertaste. In this study sucralose together with isomalt as a bulking agent was used to totally replace sucrose sweetness in sponge cake. Three other samples were formulated using acesulfame-isomalt, isomalt and sugar to compare the results with sucralose and the quality characteristics of sponge cakes were evaluated. A seven member trained panel evaluated sweetness and sensory characteristics. The results revealed that sponge cake with sweetener replacement had an increase in lightness and softness while the specific volume was decreased. Results from sensory evaluation showed that the sugar free cake containing sucralose-isomalt had an acceptable sensory sweetener quality with a higher preference than sugar, while there was significant decrease in panelist acceptance for other sugar free cakes compared to sugar containing samples. Storage conditions were chosen to encompass the typical shelf life of the products under investigation. Stored samples were also subjected to sensory evaluation during 10 days which revealed a better shelf life in samples formulated with sucralose.

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P697

EXTRACTION OF INULIN FROM TWO MEDICINAL PLANTS AND STUDY ON THE GROWTH PROMOTING EFFECTS ON A SELECTION OF PROBIOTIC BACTERIA

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Prebiotics are non-digestible food ingredients that stimulate the growth and/or activity of bacteria in the digestive system. Fructo-oligosaccharides, consist of short and medium chains of fructose are classified as prebiotics since they have the ability to selectively enhance the growth of intestinal microflora especially lactobacilli and bifidobacteria. Inulin is a prebiotic fructo-oligosaccharide which can be extracted from many plants including chicory and Jerusalem artichoke. It is mostly used in food industry to produce low calorie foods and can be used in functional foods for its health promoting and technological properties. In this research inulin from two medicinal plants including chicory roots and Jerusalem artichoke tubers was extracted and physico-chemical analysis of the properties of inulin powder was carried out. The promoting effects on growth of a selection of probiotic bacteria (Lactobacillus casei and Bifidobacterium animalis) were also investigated in vitro. Our research is ongoing and requires further testing of the probiotic effects in vivo.

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P698

THE IMPORTANCE OF POLYOLS AS A FOOD INGREDIENT

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Sweet-tasting compounds help mask unpleasant tastes, thereby enabling the development of more palatable foods, health care products and medicines. Sweetness is stimulated by a wide variety of compounds including sugars, sugar alcohols, and dipeptides. Polyols, are also known as sugar alcohols, may occur naturally in plants. Furthermore, polyols are industrially produced at high temperature by catalytic hydrogenation of relevant sugars thus; aldehydes and ketones groups of sugars are converted into alcohol. Hydrogenation of sugars reduces their bioavailability and transforms them into partly undigestible sugars. For this reason, foods containing polyols can be labeled as sugar-free. They also contain less energy than sugars and have other potential health benefits such as reduced glycemic response, decreased caries risk, prebiotic effects. Besides these health benefits, polyols have a laxative effects when consumed in excessive doses. Sugar alcohols have three chemical structure categories that are monosaccharide-derived, disaccharide-derived, or polysaccharide-derived mixtures. Polyol content of fruits varies too much depending on the type of fruits and vegetables. Such as strawberries, raspberries and cauliflower contain xylitol predominantly; celery, carrots, mushrooms contain mannitol and pears, peaches, and corn contain sorbitol excessively. The variation of polyol content of fruit and fruit juices can be used as a specific tool for authenticity assessment. For instance, sorbitol, present in apples, pears, is virtually absent in berry fruits and can be an excellent tracer to verify addition of cheap apples or pear juice to expensive berry juices.

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P702

THE STUDY OF TWO PRESERVATIVES ON THE QUALITY AND SHELF LIFE OF FLAT BREAD

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Flat breads that produce usually in many Asiatic countries have generally short shelf life so result in large losses of the bread. One of the most important factors influences the quality and shelf life of bread is use of the preservatives. In this study the effects of two preservatives, sodium-diacetate (0.3 % (w/w) in flour) and vinegar in two level (4 and 6% (w/w) in flour) on shelf life of the bread was investigated. The breads were wrapped and stored in environmental conditions. The study of physical characteristic related to staling (i.e. puncture stress) was performed using Instran apparatus at 0, 24, 48, and 72 (h) after backing. Mold and yeast growth in PDA culture were assessed at the same times; also resistance to mold growth were assessed during storage. The results for staling analysis showed that among different treatments the sample with 6% (w/w) vinegar had the minimum level of puncture stress then %4 vinegar, %3 sodium-diacetate and control sample respectively. Mold growth between sample include %3 sodium-diacetate and %4 vinegar was not significant but was significant between using %4 and %6 vinegar.

Keywords: Flat bread, preservatives, shelf life and quality

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P704

FUNCTIONAL ANTIOXIDATIVE ADDITIVE THAT REDUCE OIL ADSORPTION IN FRIED FOOD

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An antioxidant and anti-oil absorption additive was developed from polyphenols and evaluated in refined, bleached and deodorized (RBD) palm olein at 180oC using accelerated oxidation and deep frying studies. The additive (optimum concentration 0.2%) retarded oil absorption by up to 85% and inhibited deterioration significantly ($P<0.05$) in deep frying studies at more than 40 hours. The antioxidant properties were comparable to 0.02% BHT in tests such as peroxide value, anisidine value, free fatty acid, Oxidative Stability Index (OSI), polar and polymer compounds content. Different batches of French fries fried in oil containing extract were significantly ($P<0.05$) better in crispiness, taste and overall quality, when sensory evaluated, especially after the 40th hour frying compared to those similarly fried in the control oils and the oil containing BHT. The additive not only exhibited excellent heat-stable natural antioxidant properties that retarded oil absorption into deep fried food but was potentially beneficial for health with anti-hypercholesterol, antihypertensive antibacterial, antihistamine, antispasmodic, anti-tumor promoters and cancer protective properties. The new additive is from a natural renewable resource and is suitable for use in food and similar applications.

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P706

THE INHIBITORY ROLE OF PLANT EXTRACTS ON ACRYLAMIDE FORMATION IN FOODS

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Since 2002 many researches have been conducted on acrylamide formation in foods Although the greatest amount of acrylamide is reported in fried foods. Its amount in cereals such as biscuits, kracker, toasts and puffed cereals is considerable. In this study, we evaluated the inhibitory role of thymus valjaris and caraway on acrylamide formation in potato chips/pellet, bread, puffed cereals. Seven tests were designed for each sample with two extracts. The puffed and fried samples of potato, bread and snacks were prepared with the different level of these two extracts (0.002 – 4.9 g/Kg). The assessment of acrylamide amount was done by HPLC / Uv through FDA. Our finding showed that when Thyme vuljaris and Caraway extracts were added to the proding 0.1 and 1 (g/Kg product, respectively) the acrylamide amount decreased to 82.9 % and 72.5 %. There was a significant difference in results of evaluation antioxidant effects of two extracts ($p>0.05$). Use of plant extracts could be effective to reduce the amount of acrylamide up to 70 %. According to these results, It is recommended to apply the specific techniques to decrease the acrylamide content in potato products and other foods.

Keywords:acrylamide, plant extracts, antioxidant

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P707

EFFECTS OF DIETS CONTAINING MANNAN OLIGOSACCHARIDES AND ACIDIFIER CALCIUM FORMATE ON PERFORMANCE AND EGG QUALITY OF JAPANESE QUAIL (COTURNIX JAPONICA)

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Aim of this experimentation was to study the effects of dietary supplementation of mannan oligosaccharides (MOS), extracted from yeast Saccharomyces cerevisiae and acidifier calcium formate (CF) on some performance parameters and egg quality characteristics of Japanese quail (Coturnix japonica). For this study, which lasted 90 days, 183 quail, 42 days old, were distributed into 4 groups of 3 replications each and were placed in cages. The birds of control group received a commercial feed, while the birds of the other 3 groups received the same feed, to which either 6 g CF /kg or 1 g MOS /kg or both 6 g CF /kg plus 1 g MOS /kg were added. The live weight, feed consumption, feed conversion ratio and mortality of birds were not significantly ($P>0.050$) affected. The addition of MOS in the feed significantly ($P\leq0.050$) increased palmitic acid percentage of egg yolk. Also, the addition of CF significantly ($P\leq0.050$) decreased egg shape index and palmitic acid percentage of egg yolk. Furthermore, significant ($P\leq0.050$) interaction between MOS and CF was observed on palmitic acid percentage, egg shape index and egg shell thickness. No significant ($P>0.050$) effect was observed for egg: weight, specific weight, parts percentage (yolk, albumen, shell), shell deformation, yolk diameter and yolk colour (L* a* b* colour space).

Keywords: quail, mannan oligosaccharides, acidifier, calcium formate, egg, yolk, fatty acids

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P708

STUDY OF PURIFY PERCENTAGE AND INSOLUBLE MATERIAL IN IODIZED EDIBLE SALTS IN IRAN

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Salt is a dietary mineral essential for life. It is normally obtained from sea water rock deposits. Unrefined, refined and iodized salts are three kind of salt produced and consumed. In Iran refined and iodized salt is usually used. In a statistical assessment edible salts in all provinces had been investigated from the purity percentage and insoluble materials in water. According to national standard the purity percentage of salt has been improved from 5.4% to 48.1% in 2004 to 2007. The insoluble materials of salts have been become well from 58.48% to 41% in 2004 to 2007 based on national standard. The results show that salt characteristics have been improved during 2004 to 2007 but they still do not complies with any national standard completely. It is recommended to do chemical processing to refine edible salts.

Keywords: Iodized edible salts, insoluble materials

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P709

CITRININ LEVELS OF NATURAL FOOD COLORANT, MONASCUS DYES

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The aim of this research was to determine the citrinin (CIT) levels of Monascus dyes produced in laboratory scale using *Monascus purpureus* DSM 1603, *M. purpureus* DSM 1604, *M. purpureus* NRRL 1596 and compare them with 8 commercially available Monascus dyes. CIT was detected using high performance liquid chromatography (HPLC) with a fluorescence detector set at 331 nm excitation wavelength and 500 nm emission wavelengths. The limit of detection of CIT was 1 ppb, limit of quantification was 5 ppb. The recoveries for Monascus dye samples with the known amounts of CIT (50, 100, 400 ppb) were 95.33%, 97.08% and 93.59%, respectively. CIT levels were under the detection limit in both of the products produced using *M. purpureus* DSM 1603, *M. purpureus* DSM 1604. Average value of CIT in 8 commercial samples was determined to be 5,76 ppm (minimum 0.104 ppm and maximum 18.735 ppm). CIT was not detected in the dyes produced using *M. purpureus* DSM 1603 and *M. purpureus* DSM 1604, whereas 0,300 ppm CIT was detected in the dyes produced using *M. purpureus* NRRL 1596. The research results indicate that controlled fermentation procedures can control citrinin levels in Monascus products

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P710

PRODUCTION POSSIBILITIES OF MONASCUS DYE USING DIFFERENT AGRO-INDUSTRIAL PRODUCTS

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In this research it was aimed to determine the production possibilities of the Monascus dye, a natural food colorant produced by fermentation of rice using *Monascus purpureus*, not only from rice but also from different agro-industrial products (broken rice, wild rice (*Oryza sativa* L.), potato, and wheat bug damaged wheat). Ten days laboratory scale solid state fermentation (SSF) process was performed using three different species of Monascus; *M. purpureus* NRRL-1596, DSM-1603 and DSM-1604. The color stability of the dyes in different pH (between 3-9) and temperature (between 30-90 °C) was investigated. The differences between these dyes, produced from different raw materials according to their color stability were determined. While the highest Hunter Lab a* values (redness) were determined as 13.59 and 17.41 for the dyes produced by *M. purpureus* NRRL-1596 from wild rice and potato, respectively. However, lower a* values were determined for broken rice and wheat bug damaged wheat. Additionally, it was determined that the temperature and pH values were significantly effective ($p < 0.05$).

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PRODUCTION AND CONCENTRATION OF ISOFLAVONES IN PREDIGESTED, GERMINATED AND NON-GERMINATED WHOLE SOY POWDER

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The health benefits associated with consuming soybeans have been primarily attributed to isoflavones found in soybeans. It has been suggested that pre-digestion and germination of soybeans hydrolyzes the non-bioavailable isoflavones into their bioactive forms. Therefore, overall goal of this study was to compare the concentrations of isoflavone isomers genistein, daidzein, genistin and daidzin in raw, predigested, non-germinated and germinated soy powders produced from three different soybean varieties, Vinton 81, DF 222 and E05276-T. Isoflavones were extracted by standard procedures, separated on a C-18 reverse phase HPLC column, and quantified at 262 nm using a UV detector. Stachyose content of the soy powders was also analyzed in a similar manner by HPLC. Our results showed that genistin and daidzin were more abundant than genistein and daidzein in all the powders analyzed. Soaking, predigestion and germination increased concentrations of isoflavones suggesting conversion of these compounds to their bioactive form. Stachyose contents of all soybean varieties decreased upon soaking, predigestion and germination. These results suggest that pre-treatment and processing methods could influence the concentrations of these bioactive compounds.

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P712

CONSUMER JUDGEMENT OF FOOD ADDITIVES IN HUNGARY

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Consumers' knowledge and judgement of food additives are timely topics as consumers are constantly changing. Hereby they are always setting new demands and expectations regarding foodstuffs. Hungarian consumers declared serious concern in case of food additives. Thus the aim of this presentation is to give an overview about the Hungarian consumers' perceptions of food additives. Questionnaire interviews were performed in 2009, based on snowball method. Consumers' knowledge and attitude were measured with 10 groups of questions on a 5-point Likert scale. 400 completed questionnaires were collected and the data were analysed with SPSS 18.00 statistical software. Consumers' attitudes and fears of food additives, furthermore the respondents' judgement on the additive contents including 64 foodstuffs were investigated and these results will also be presented. Consumer groups created by cluster analysis – on the basis of their judgement of additives – will be demonstrated. Relying upon our results connection is sought between the consumers' knowledge level and their health conscious food choice. As a summary it can be said that Hungarian consumers are aware of the possible health destroying effects of food additives; however, this knowledge does not appear in their food choice. They are able to make difference amongst the groups of food additives, so segmented communication for certain additive groups is needed.

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COMPLEX APPROACH FOR VERSATILE CHARACTERIZATION OF DISTINCTIVE PROPOLIS SAMPLES PROVIDING THE BASIS OF PROPOLIS CONTAINING WINE

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Propolis is a resinous substance collected by honeybees from various plant sources. The composition depends on time, vegetation, and the area of collection. Ethanol extracts of propolis from 4 area of Hungary were prepared for 8 distinctive analytical examinations. The examined parameters and the used techniques were as follows: antioxidant activity (DPPH); total polyphenol content (with Folin-Ciocalteu); polyphenolic derivatives (HPLC-PDA); prolin-content (UV-spectrophotometric determination); trace elements as Iron and Zinc (FAAS); carbohydrate composition (HPLC-ELSD); benzoic acid and esters (GC-MS); B3 vitamin (HPLC). The antimicrobial activity of different samples was determined for both Gram-positive and Gram-negative species. Total polyphenol content of different samples ranged from 214 ± 4.8% to 274 ± 5.5% (mg g-1). The concentration of Zn was 0.47 – 1.57 mg kg-1; Fe 0.46 – 2.78 mg kg-1; B3-content of different samples was between 0.6 – 4 mg kg-1. It was revealed that propolis related materials have a potential use as preservatives in the food industry. The potential applicability of the propolis has been studied in food production in order to enhance its bioactive content. Several wine batches have been produced from the historical Hungarian wine region with enhanced propolis content. Iron and Zinc content, antioxidant activity and total polyphenol content have been analyzed.

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P714

AN INNOVATIVE E-LEARNING TRAINING PROGRAMME ON FOOD SAFETY LEGISLATION - FROM FARM TO FORK EUROPEAN FOOD SAFETY LEGISLATION (F4ESL)

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F4ESL is an innovative and integrated online training programme on EU Food Safety Legislation ensuring vocational education via newest learning methods. F4ESL aims to fill the legislation gaps in food sector with "from farm to fork" food safety approach covering all related EU regulations. Six EU countries participated in this project to share their knowledge and experience on food safety legislation and e-learning technology. To reward their endeavour, EU decided to fund the project through Lifelong Learning Program "*Leonardo da Vinci*" (2009-1–TR1–LEO05-08647). F4ESL curriculum consists of 5 modules: Introduction, Legislation on Product, Legislation on Process, Labeling, and Public Powers. The training will be piloted across all European countries in 2 sessions, in the early 2011. About 500 trainees will be trained free of charge in scope of F4ESL project. The effects of the project will be measured by surveys, seminars in partner countries and valorization conference in Turkey.

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INVESTIGATION LEGAL USE OF SORBIC AND BENZOIC ACID IN SAUCES AND FRUIT JUICES IN TURKEY

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The purpose of this research was to investigate the exceed use of sorbic acid and benzoic acid in different brands of sauces (30) and fruit juices (59) obtained from markets in Turkey. Sauce and the fruit juice samples were analyzed for benzoic and sorbic acids by using an isocratic high performance liquid chromatography technique with a diode-array detector at 235 nm. The chromatographic separation was achieved with a C18 column and acetate buffer (pH=4.74): methanol (70:30) as the mobile phase. According to results of the study benzoic acid was only detected in 5 fruit juice and sauce samples and sorbic acid was detected in 5 drink and 4 sauce samples. Concentration of benzoic acid was found as 79.68 mg/kg and 663.23 mg/kg in sauces and fruit juices, respectively. Concentration of sorbic acid in juice samples and sauces was found as 79.68 and 1937.66 mg/kg, respectively. These values remained below acceptable limits according to Turkish Food Codex. This study showed that amount of sorbic acid and benzoic acid in sauces and fruit juices stay at legal level.

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P716

MICROBIOLOGICAL RISK ANALYSES IN CATERING SECTOR

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The aim of the research was to assess food safety risks in catering establishments. To analyse food safety risks of ready-to-eat foods, the internal database of the Food and Veterinary service of the Republic of Latvia was used. Catering establishments, food items, methods of technological processing, as well as environmental objects were encoded to perform mathematical analyses. The probability of presence of coliforms and S.aureus in food and environmental samples as well as total plate count of ready-to-eat foods was assessed to forecast common risks in catering establishments and to set hygiene management priorities in frame of HACCP procedures. For estimation of individual risk factors results were analysed using SPSS statistical package and $p<0.05$ was considered to be statistically significant. Significant differences were established between presence of certain microorganisms in foods and such factors as food group, method of technological processing, and type of catering establishment. The results on microbiological contamination of foods correlated with the results on contamination of environmental objects. The research suggests that risk assessment both in state's official control and catering establishments' self-control level should be performed to predict actual food safety risks and to assure adequate monitoring and communication measures to prevent foodborne disease outbreaks.

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P717

SUCCESSFUL ESSAY ON DECISION TREE MODIFICATION IN DETERMINATION OF SIGNIFICANT HAZARDS DURING HACCP SYSTEMS IMPLEMENTATION IN R. MACEDONIA

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Successful essay on "Decision tree" modification in determination of significant hazards during HACCP systems implementation in R. Macedonia, during HACCP system implementations at majority of food operators we have faced generally known problem witch is: tool "Decision tree" does not provide one hundred percent accuracy in significant hazard determination. Due to that, this tool was not required to be mandatory used. The main goal of this study was to improve classical model of this very useful tool. Research team, with its ten year experience, has made comparison on eight "Decision tree" models and has tried to create new model with help of standard statistical analyses on 46 production charts of various types of food. Using modified model – MK-LD-1, we have succeeded to reduce significantly number of determined CCPs in 41 plants, to be less than 5 for each type of hazard. With modifying classical models of "Decision tree" we have succeeded to obtain new model MK-LD-1, with which we have made more precise practical determination of CCP from OPRP in HACCP system implementations in R. Macedonia.

Keywords: HACCP system, decision tree, modified MK-LD-1 model, Republic of Macedonia

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P719

INVESTIGATION OF SOME BLEACHING AGENTS AND BENZOIC ACIDE IN WHEAT FLOUR COMMERCIALLY AVALIABLE ON THE LOCAL MARKETS IN ANTALYA

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The purpose of this study was to investigate the occurrence of some bleaching agents and benzoic acid in wheat flour commercially available on the local markets in Antalya. Bleaching agents are food additives which make the flour appear whiter. For this purpose, the most commonly used bleaching agents are benzoyl peroxide, potassium bromates and iodine. Benzoyl peroxide is among the most common bleaching agents used for wheat flour. Benzoyl peroxide in flour is almost completely converted to benzoic acid within a few days of treatment. The residues of bleaching agents in foods are harmful to human health. So, control of these residues is necessary to protect consumer health. In this study, 25 flour samples were analyzed for the presence of this bleaching agents and benzoic acid. The liquid chromatography technique was used to determine of benzoyl peroxide and benzoic acid (Saiz A.I. and Friends 2001). Also the method 996.3 described in Official Methods of Analysis of AOAC was used to determine bromates and iodates in flour samples (AOAC, 2004). As a result of this research were not detected any residue of bleaching agent and benzoic acide in flour samples. This is a very affirmative result for consumer health.

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P720

THE EVALUATION OF AGRICULTURAL PRODUCTS GROWN IN AYDIN PROVINCE AND TURKEY IN RESPECT OF THE RAPID ALERT SYSTEM FOR FOOD AND FEED (RASSF) ACTIVITIES

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Turkey and European Union (EU) have prominent relations on the basis of international trade and agricultural products in particular. Hereby, the main of the study is to determine Rapid Alert System for Food and Feed (RASSF) activities and notifications on many strategic agricultural products such as dried fig, olive, many fruits and vegetables planted in Turkey and Aydın province intended for EU export. EU has 58.58% and 13.0% of total and agricultural exports in Turkey, respectively. Thus, it is crucial to determine the activities of RASSF to be sustain export facilities destination to EU for Turkey. The purpose of the RASSF is to provide the control authorities with an effective tool for exchange of information on measures taken to ensure food safety. Its activities focus on all type of chemical and microbiological contamination and the presence of "foreign bodies". According to RASSF reports, 141, 202, 181, 199 (118 of its on aflatoxin), 254, 293 and 308 notifications were declared for agricultural products, origin of Turkey during 2002 – 2008 years, respectively. Nevertheless, it was also specified that some notifications taken from RASSF which was grown in Aydin region. Despite the fact that 428.47, 130.56, 396.44, 485.93, 379.57 tons dried figs were taken alert notifications, 375.81, 130.56, 396.44, 485.93, 371.91 tons dried figs of those, origins of Aydın were sent to Turkey for border rejections on aflatoxin from 2005 to 2009 years, respectively.

Keywords: RASSF, aflatoxin, notifications, contaminations, Aydın province.

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P721

EFFECT OF WASHING TREATMENT WITH OZONATED WATER ON THE MICROBIAL QUALITY OF FRESH VEGETABLES

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Ozone is one of several new sanitizing agents for produce introduced in recent years and approved by the U.S. Food and Drug Administration as alternatives to chlorine. It has a short half life at ambient temperature and does not leave behind residues unlike other commonly used sanitizers. Ozone is effective against a wide range of bacteria, viruses, yeast, molds and protozoa. The purpose of this investigation was to determine the antimicrobial efficacy of ozonated deionized water generated by a recirculating ozone reactor (CFG 20) against various heterotrophic bacteria as pathogens, spoilage organisms, and indicators of fecal contamination on the comercial vegetables. The antimicrobial effects of ozone were determined in deionized water with or without added chlorine in the form of 100 ppm. All solutions were ozonated at room temperature (19 to 21°C). In this study, spinach and cabbage was washed ozonated water dips for five different periods (2, 4, 6, 8, 10 min) and chlorinated water (100 ppm) the reduction in the total bacterial count, fecal coliform, E. coli, Staphylococcus aureus, Vibrio spp. counts were examined. The promising results indicated the efficacy of ozone to reduce the microbial populations in vegetables. Ozone and chlorine-ozone reduced aerobic plate count up to 1.5, 1.3 and 1.3 log respectively.

Keywords: Ozone, chlorine, antimicrobial efficacy, pathogen.

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P722

DETERMINATION OF HISTAMINE IN CANNED TUNA FISH IMPLICATED IN A FOOD BORNE POISONING

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Histamine is a simple chemical substance created during processing of the amine acid histamine. Histamine is also an agent in inflammation and increased presence of histamine causes allergic reaction. Histamine may play a role in the increased prevalence of food in tolerances. The objective of this study was to determine of histamine contents, 43 samples of canned Tuna fish produced from 5 manufactures in Iran, and analyzed by ELISA (REDASCREEN® Histamine). In 30 of 43 canned tuna fish samples (69.8%), the presence of histamine detected in concentration between 17 to 210 mg/100gr. Histamine in 8 canned Tuna fish samples (18.6%) from two manufactories were higher than the tolerance limit of histamine contents (50mg Histamine/100gr) accepted by European countries. The values were comparable and in the range of with the literature values. The results of this study indicate that tuna fish of produced and marketed in Iran have concentration bellow further studies should be carried out to investigate the presence of these toxin in different fish and other sea food products.

Keywords: Histamine, canned tuna fish, ELISA

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P723

SEAFOOD AND HACCP

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Food safety regulations and the perception of risk are different among countries. This can lead to persistent trade frictions and even reduce food trade. These differences may also lead to increased dialogue between countries, with improved food safety systems the result. Although little disruption to trade has occurred for food safety reasons (considering the total volume of food trade), trade issues or crises related to food safety are wide ranging. Nowadays, "Safety" is the most important field that consumers expect from the food. For this reason, when we talk about "quality in the food sector", Hazard Analysis of the Critical Control Points (HACCP) is a system that is accepted as the most reliable system by international authorities. This system intends to prevent the problems about food safety and control the diseases caused by food. The aim of this study is to analyse the integration of fish and/or seafood and HACCP systems.

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P724

DETERMINATION OF FLUORIDE IN BOTTLED WATER SOLD IN TEHRAN MARKETS, IRAN

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Fluoride is a necessary element for human health and it can intake from drinking water and food, but the high intake of it can not be useful. The intake of excess fluoride can cause fluorosis which affects the teeth and bones. Low levels of fluoride intake can help to prevent dental problems. Most of bottled waters may not have a sufficient amount of fluoride, which is important for good dental health. Fluoride can occur naturally in source waters which are used for bottling. The aim of this study is evaluation of fluoride in existing bottled waters in Tehran market and compare with the stated value on the label. Thirteen commercial brands of bottled drinking water were collected randomly from various markets in Tehran. Determination of fluoride concentration was done according the standard SPANDS method by using a Spectrophotometer DR/5000. The obtained results showed that the mean (± SD) fluoride concentration of the bottled drinking water samples was 0.29 (± 0.159) mg/L with a range of 0.06 - 0.67 mg/L. The fluoride concentration was compared to water bottled international standards, and results were indicated that in all samples fluoride concentration was lower than permissible level.

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P725

THE DETERMINATION OF HYGIENIC QUALITY OF FISH PROCESSING FACTORY AND PROCESSED SEAFOOD PRODUCTS BY USING 3M PETRIFILM

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The hygienic quality of fish processing factory and processed seafood products are very important for elimination of foodborne pathogens. For this purpose 25 samples of processed seafood products (Fish, shellfish, processed fish products especially marinated fish, seafood salads) and 25 samples from the stages of processing of fishery products (from the tables, equipments, hands, floors and water). Samples were taken from the fish processing factory and fishery products for analysing some microorganisms (Aerobic, Coliform, Escherichia *coli, Enterobactericeae,* yeast and moulds counts, *Staphylococcus aureus*, bacteria counts). If this fish processing factory have any problems, in conclusion seafoods will carry high levels of microorganisms. If seafoods with high levels of microorganisms are consumed by people, these products can be caused of illnesses. The aim of this study was to determine the hygienic quality of processed seafood products and fish processing factory by using 3M Petrifilm.

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P726

EFFECT OF SALT CONCENTRATION, SOAKING TEMPERATURE AND SOAKING TIME ON THE REDUCTION OF ACRYLAMIDE IN FRENCH FRIES

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Acrylamide is a carcinogen compound produced in potatoes, cereals and other baked foods during deep-fat frying, cooking and roasting processes. In this study, several pretreatments (salt concentration, soaking temperature as well as soaking time) were applied prior to deep-fat frying of potato strips and their effects were investigated on the acrylamide production level. Potatoes (Agrian variety) were cut in 5.0 × 0.6 × 0.6 cm^3 and fried for 9.0 min at 190°C. The acrylamide was then extracted in an aqueous condition and analyzed by a GC-MS using the standard addition procedure. The highest acrylamide reduction was found when potatoes were soaked in the mixed salts of calcium and sodium chlorides at 0.5% (w/v) for 60 min at 90°C and at 0.9% for 40 min at 90°C. Compared to the salt concentration and soaking time, soaking temperature indicated greater influence on the reduction of acrylamide production.

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P727

ALUMINUM RESIDUES IN COOKED BEEF PACKED WITH ALUMINUM FOILS AND COOKED AT DIFFERENT TEMPERATURES

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The effects of aluminum utensils and cooking methods on concentrations of aluminum in raw (control) and cooked beef samples were studied. Beef was wrapped in aluminum foil and cooked in boiling water with pieces of onion and stored at 4°C for interval periods 0, 12, 24, 36 and 48 hour. Cooking was done in electrical oven for 60 min. at 120°C, for 40 min. at 180°C and for 20 min. at 240°C. Aluminum residues were found in all the samples. The average concentration of aluminum in raw beef were 0.28 mg/kg (wt/w), meanwhile the average level of aluminum in cooked beef wrapped in aluminum foil for 60 min. at 120°C were 0.34 mg/kg (wt/w). Cooked beef had a significant higher ($P<0.05$) aluminum levels in compared to control samples due to migration of aluminum from aluminum foil and aluminum utensils to meat. Under all experimental trials, the highest aluminum concentration levels were observed in beef cooked with onion (1.90 mg/kg) and the lowest concentrations were observed in beef cooked by boiling without adding any ingredients (0.30 mg/kg). The obtained results confirmed that increase in cooking time and in cooking temperature significantly increase ($P<0.05$) the aluminum concentrations levels of cooked beef wrapped in aluminum foil. Aluminum utensils should be avoided from cooking of meat. Cooking of beef wrapped in aluminum foil at 120°C for 60 min. is recommended to safe consumers from the hazards of aluminum residues.

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P729

FEASIBILITY STUDY ON WASTE BREAD RECYCLING IN TEHRAN

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Breads in different types are prepared in 60000 bakeries in Iran. More than 96% of domestic bakeries are working in traditional manner and only 4% of them are run as industrial form. Lavash, Barbari, Taftoon and Sangak are the most popular Iranian breads with proportional usage rate of 40%, 25%, 25% and 6% respectively. There is almost a viable argument about flour and bread that is typically refer to the small round waste of them, in which it may roughly indicate up to 30% waste. However, this will affect economically about 300 M$ damage to the imported bulk of wheat annually. Moreover, this may concern the safety aspect in human and husbandries. In this investigation, we study about the effective factors on quality, technology, processing, recycling of waste bread in Tehran. 20 samples of waste bread were analyzed for microbial and mycotoxin contaminants. The media used for microbial tests was Sabouraud Dextrose and Yeast Extract Glucose chloramphenicol Agar includes chloramphenical.Toxicology Analysis for determination of 4 mycotoxins Aflatoxin, Zearalenone, Ochratoxin A and Deoxynivalenol were done by HPLC with fluorescence detector. Results showed that from 20 samples only 1 sample had no contamination, and 19 samples were contaminated to Aspergillus, Penicillium and Mucor. Also 8 samples had Aflatoxins, Ochratoxin A and Deoxynivalenol, contamination, none of samples contaminated to Zearalenonen. Based on our results, presence of microbial and toxic contamination in bread waste are inevitable, which are harmful for human health and it is necessary to control of it in this regard.

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P730

REVIEW ON PROPERTIES AND SAFETY OF LACQUERS IN FOOD METAL PACKAGING

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Lacquers are polymer based products that are thermally processed, and protect the metal packaging against food corrosion. Lacquers not only provide a very good and long enough shelf life for metal packaging, but they also can decrease the migration of heavy metals significantly which in addition to health risks may cause undesirable color or flavor in packed food. Migration phenomenon from lacquer to the food is being considered as a risk factor for human health. The different parameters affect migration from lacquers such as inefficient temperature, storage time and unconditioned storage pressure. One of the most popular migrating components is Bisphenol A Diglicidyl Ether (BADGE). BADGE is the lowest molecular weight of epoxy resin which was detected in some canned foodstuffs. BADGE cause disfunctionality of sex (female) hormones and also is of concern due to its teratogenicity and carcinogenicity. This review showed that the comparison with anhydride epoxy and phenolic epoxy lacquers from migration & the stability view point. Consequently, the epoxy-anhydride lacquer has more stability in variety of temperature and food characteristic than epoxy-phenolic lacquers. In addition, less migration in epoxy-anhydride has occurred. According to variable metal packaging, lacquers, food characteristic and reaction between them, these phenomenons need to be studied more carefully for the stability of foodstuffs in metal packaging.

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P731

THE COMPARISON OF DIFFERENT DETERMINATION METHODS OF PESTICIDES AND THEIR RESIDUES

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Nowadays; human's increasing food requirements are provided from limited agricultural estates. Because of that agricultural pest control is more important than before. Pesticides, in other words biocides, are organic, inorganic or synthetic components which are used for destroying unwanted organisms. All of the drugs which are used on agricultural pest control and the materials using to produce that drugs are added to the group of pesticides. Pesticides and their residues have negative effects on environment and toxic or carcinogenic effects on human beings. Due to this, the controls and analyses of pesticides and their residues are major. The grape pesticide's residue passes to wine is a matter of discussion. So recently according to organic farming, organic wines are improving. In this study; different methods on analytically determination of pesticides used on grapes and their residues in wine are explained. And additionally global pesticide researches and pesticide divisions on vineyards & grapes are indicated. Also the risks of pesticides and the chemicals used in wine and grapes are added.

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P732

DETERMINATION OF TOTAL MERCURY LEVELS IN CANNED TUNA FOR ACCEPTABLE MONTHLY INTAKE IN IRAN

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In this survey, the levels of total mercury were measured in canned tuna in Iran. The objective of the present study was to determine the estimation of the acceptable monthly intake of mercury with having no cancerous effects. So 452 canned tuna were analyzed and the amount of total mercury was measured by Leco AMA 254 Advanced Mercury Analyser. The three times analysis of each sample showed that total mercury concentration was higher in white-style tuna (mean 0.65 ppm) than light-style ones (mean 0.47ppm). Maximum mercury in the cans was 1.535 ppm, but in %18.5 of white tuna samples exceeded 1 ppm and more than %80 of white tuna were greater than 0.5 ppm (FDA standard value).All of light tunas were less than 1 ppm. There were no significant differences in mercury levels in tuna packed in oil compared to oily water. According to these results, the acceptable monthly intake of canned tuna for young children, older children, women and men (EPA) calculated approximately 45, 90, 185 and 250 g/ month respectively. It is recommended that people use less canned tuna, will have the least mercury intake.

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P734

METAPENAEUS AFFINIS CONTAMINATION WITH DIFFERENT HEAVY METALS IN HORMOZGAN PROVINCE - IRAN

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Shrimp may easily absorb pollutants from the ambient water and from their food and then deposit those in the tissue through the effects of bioconcentration, bioaccumulation and the food chain process. In this regard, heavy metals have long been recognized as an important pollutant due to their toxicity and ability to accumulate in marine organisms. Human as consumer of seafood may be affected by consuming them. The effects include chronic and acute diseases. Measurement of Fe, Cu, Zn, Cd, Pb and Ni in Metapenaeus affinis's flesh from Hormozgan Province - Iran was done to comparison with human consumption standards. 34 samples were chosen randomly and prepared according to AOAC, 2005. The study has completed using Flame Atomic Absorption Spectrophotometer (FAAS) and Polarography. As the Metapenaeus affinis is using for human nutrition, it is necessary to comparison with safety standards. All the above elements' concentration was under the dangerous margins.

Keywords: Metapenaeus affinis, Fe, Cu, Zn, Cd, Pb, Ni, Flame Atomic Absorption Spectrophotometer (FAAS), Polarography

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P735

COMPARISON OF DIFFERENT DETECTION METHODS OF COPPER AND ZINC IN JINGA SHRIMP OF PERSIAN GULF

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Intense activity in the industrial and agriculture sectors have inevitably increased the levels of heavy metals in many natural waters. One of the largest problems associated with the persistence of heavy metals is the potential for bioaccumulation and biomagnifications causing heavier exposure than is present in the environment alone. Monitoring heavy metal content in organisms can better give meaningful information on the pollution status of a water body than merely monitoring the metals in water and sediments. Measurement of copper and zinc in Jinga Shrimp from three Iranian provinces attached to the Persian Gulf by Flame Atomic Absorption Spectrophotometer (FAAS) and Polarography and comparison between them were two purposes of this study. 34 samples were selected from each state and prepared by HNO_3 for analysis after separating of flesh and ashing. Definite solution determined by both devices simultaneously for decrease errors. Copper and zinc concentrations in samples of Hormozgan, Boushehr and Khuzestan States were determined and statistical analysis has shown no significant differences between two devices despite the non-equal data.

Keywords: Copper, zinc, Jinga shrimp, flame atomic absorption spectrophotometer (FAAS), polarography

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P736

FOOD TRACEABILITY

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In recent times, the accurate and timely traceability of products and activities in the supply chain has become a new factor in food and agribusiness. Increasingly, consumers in many parts of the world demand for verifiable evidence of traceability as an important criterion of food product quality/safety. This trend has been underpinned by several market-pull factors including increasing global demand for food products originating from diverse sources, high incidence of food-related health hazards and increasing concern over the impacts of genetically modified organisms on the human food chain and the environment. In order to meet consumer demands for consistent supply of top quality, safe and nutritious foods, as well as rebuild public confidence in the food chain, the design and implementation of full backward and forward traceable supply chains from farm to end-user has become an important part of the overall food quality assurance system. Farmers, postharvest handling operators, marketers, research practitioners and policy makers need good understanding of the concepts and implications of supply chain traceability to assist in developing and implementing appropriate technological interventions to meet consumer demands for traceable agricultural supply chains. Development of appropriate measurement tools for food product labeling and identification, activity/process characterization, information systems for data capture, analysis, storage and communication and the integration of the overall traceable supply chain are essential for success. The aim of this review is to analyze legal and regulatory aspects of food traceability and to provide a general framework for the identification of fundamental mainstays and functionalities in an effective traceability system.

Keywords: Traceability, food, quality, identity preservation, labeling

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P737

HACCP APPLICATION IN WINE INDUSTRY

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HACCP is a scientific system for process control that has long been used in food production to prevent problems by applying controls at points in a food production process where hazards could be controlled, reduced or eliminated. HACCP consists of seven steps; these are; conducting a hazard analysis, identifying the critical control points, establishing critical limits for each critical control point (CCP), establishing monitoring procedures, establishing corrective actions, establishing recordkeeping procedures and establishing verification procedures. Wine has been consumed for more than three-four thousand years. The history of wine is inextricably interwoven with human history. Wine is a less hazardous product than other products for having high alcohol volume and low pH. Wine is considered safe and therefore it should be approached differently. There are some different approaches of HACCP application in different countries. In this study, the HACCP principles and different approaches in various countries is investigated.

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P738

FOOD SAFETY KNOWLEDGE AND PRACTICES AMONG COLLEGE FEMALE STUDENTS IN NORTH OF JORDAN

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Young adults have inadequate knowledge about measures needed to prevent foodborne illnesses. The objectives of this study were to assess the level of food safety knowledge and to investigate the association between the level of food safety knowledge and the socio-demographic and academic variables among college female students staying at dorms in north of Jordan. Information concerning socio-demographic and academic characteristics and food safety knowledge were collected using self-administered questionnaire. Food safety questions included 5 major scales that covered key food safety concepts. A total of 867 female students participated in the study (mean age = 20.07±1.81 years). The overall passing percentage of food safety knowledge was 33.9%. Students were most knowledgeable about prevention of cross contamination and disinfection procedures and had the most difficulties with items related to cooking responsibilities and with food sources of foodborne pathogens. Chi-square results revealed that students who were seniors and in majors related to health sciences, always prepared foods by themselves, reported that they had excellent or very good food safety knowledge, ate out 3 times or less from restaurants, and previously got food poisoning were more likely to pass food safety knowledge questions ($P<0.05$). In conclusion, improving students' knowledge about food safety is an issue that should be taken in consideration; therefore there is a need for developing food safety educational programs that cover key food safety concepts. The school and university setting would be an effective place to reach and teach the young with food safety concepts.

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P739

QUANTIFICATION OF COMPOSITION AND SOME MINERAL CONTENTS TO DETERMINE THE CONTENT OF MECHANICALLY DEBONED POULTRY MEAT IN THE SUCUK MARKETED IN TURKEY

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In this study, the effect of mechanically deboned poultry meat addition into the most widely consumed poultry meat added sucuk products of national-scaled five different brands on the mean chemical composition and mineral content were investigated, and the confirmity of such products to the related standarts was explored. The pH, water activity, penetrometer and colour (L*, a*, b*) values and moisture, protein, fat and ash and Ca, Mg, P, Fe, Zn, Mn, Na and K contents as well as nitrate, nitrite and Pb and Cu residue analyses in the samples were conducted. It was concluded that Ca, Mn and ash contents could be distinctive properties to detect the mechanically deboned poultry meat added sucuk products under laboratory conditions. Mechanically deboned poultry meat added sucuk products were determined to conform with Meat Regulations of Turkish Food Codex with respect to pH value and nitrate, total nitrite and heavy metals (Pb, Cu) contents.

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P740

THE ROLE OF SAUSAGE SLICER DEVICE AND HAND OF WORKERS TO SOME BACTERIAL CONTAMINATION AT SUPERMARKETS OF TEHRAN PROVINCE

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The increasing of urban population and occupation has changed eating pattern, so people tend to eat RTE such as sausage. This product has high nutritional value and produce to different forms of heated in Iran. One of the bacterial critical points after manufacturing of sausage is environment and personal hygiene at supermarkets. Unhygienic statues of hand of sellers and slicer can cause contamination of sliced sausages to foodborne pathogens. So these products concern as a consumer health risks. So we investigate the S.aureus, coliform and E.coli contamination of hand of sellers, slicer device and sliced sausage at supermarkets of Tehran province. In this survey sampling were done from hand of sellers, surface of slicer and sliced sausage at 40 supermarkets on Tehran province, randomly. The media for identification and counting of S.aureus, coliform and E.coli were used (BP, CM, BGB, VRBA, EMB 37ºC/48h; BGB, PW 44ºC/48h, 37ºC/48h). Mean±SE of S.aureus and coliform were hand of sellers>slicer>sausage, and only 2 samples (hand and sausage) had E.coli. So, unhygienic hands and slicer have potential source for cross contamination of S.aureus and coliform to sliced sausages. Mahdavi (2008) reported S.aureus is able to form biofilm on slicer. The hygienic inspection doesn't perform at supermarkets recommend the sausage slicer device remove from supermarkets and only vacuum slice sausage sells to consumers.

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P742

BLACK SEED AS A FUNCTIONAL SPICE

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Having a large number of species, black seeds with their own special and strong smell and with their bitterish taste have important functional components. The black seed is commonly used in our country in kitchens, food production, especially in bakery products, and in some kinds of cheese as an ornament. Additionally, it has been used in modern and alternative medicine due to its functional components such as p-simen, timokinon and α-pinen. In the previous studies, it has been determined that it is effective as a diuretic, blood pressure-lowering, a milk facilitator in nursing mothers, an appetizer, a flow expectorant and a glucose tolerance alterative in diabetes. Also, owing to the vital seed oils it contains, it is effective against hair loss and scuff; and it was reported that its extract and seed oil have antimicrobial effect. Moreover, it has been notified that black seed has cytotoxic effects on some cancer cells and that it increases the production of anticor for specific tumors. It is reported that the proteins in black seed have a big potentiality as an antioxidant in most of foods and as a functional agent in regulating the immune response.

Keywords: Black seed, functional ingredient, antimicrobial and antioxidant effect.

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P743

HETEROCYCLIC AROMATIC AMINES IN RAINBOW TROUT COOKED BY DIFFERENT METHODS TO VARIOUS LEVELS

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The effects of different cooking methods (microwave, oven, hot plate, pan-frying, and barbecuing) and levels (rare, medium, well done, and very well done) on formation of heterocyclic aromatic amines (HCAs) in fish were investigated with PRS extraction method in the present study. Identification and quantitative analysis of HCAs was carried out using a HPLC system with DAD-type detector. HCA contents of fish samples cooked with microwave and hot plate at every degree of doneness were undetectable levels. For oven-cooking of samples, 2.09 ng/g total HCAs amount was only detected in well done cooked samples, all of which was IQ (2-amino-3-methylimidazo[4,5-f] quinoline). The highest total amounts found in fish for pan-frying and barbecuing were 5.89 and 3.52 ng/g, respectively. In addition, important part of total HCAs amount in pan-fried and barbecued samples belonged to 4,8-DiMeIQx (2-amino-3,4,8-trimethylimidazo[4,5-f]quinoxaline). 2- amino-1-methyl-6-phenylimidazo[4,5-b] pyridine (PhIP), 2-amino-3,8-dimethlyimidazo [4,5-f]quinoxaline (MeIQx), 2-amino-9H-pyrido[2,3-b]indole (AαC) and 2-amino -3-methyl-9H-pyrido[2,3-b]indole (MeAαC) could not detected in any samples analyzed.

Keywords: Heterocyclic aromatic amines, rainbow trout (Oncorhynchus mykiss), cooking methods, cooking levels, PRS

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HETEROCYCLIC AROMATIC AMINES IN CHICKEN COOKED BY DIFFERENT TECHNIQUES TO VARIOUS LEVELS

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The effects of different cooking techniques (microwave, oven, hot plate, pan-frying, and barbecuing) and levels (rare, medium, well done, and very well done) on formation of heterocyclic aromatic amines (HCAs) in chicken were investigated with PRS extraction method. A HPLC system with DAD-type detector was used for identification and quantitative analysis of HCAs. No HCAs were detected in any samples cooked with microwave, oven, hot-plate, and pan-frying to various levels. HCAs were only detected in chicken cooked with barbecue. Increasing the cooking level in barbecued samples increased total HCA content. While the difference of the total HCA content between rare and medium cooking levels was minor, the difference of the total HCA content between well done and rare and between very well done and rare level barbecued chicken samples was 1.7 and 2.4 fold, respectively. The most abundant amines found in terms of mass such as PhIP (2-amino-1-methyl-6-phenylimidazo[4,5-b] pyridine) and MeIQx (2-amino-3,8-dimethlyimidazo[4,5-f]quinoxaline) was only detected in well done barbecued chicken as 1.31 ng/g and 0.39 ng/g, respectively. 2-amino-9H-pyrido[2,3-b] indole (AαC) and 2-amino-3-methyl-9H-pyrido[2,3-b]indole (MeAαC) were not detected in any samples.

Keywords: Heterocyclic aromatic amines, chicken, cooking techniques, cooking levels, PRS

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TECHNOLOGICAL DEVELOPMENT ON LAYERED PRODUCTS FOR FOODS OR FOODSTUFF - EVALUATION BY PATENTING DOCUMENTS

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Packaging is one of the most important processes to maintain the quality of foods products for storage, transportation and end-use. For a long time, the price of materials employed for packaging food has been remained high and it was often costliest the food itself. Technological innovations made possible to produce packaging material cheaply. One of these processes is known as coextrusion. This technique makes a film with two or more layers with different plastics not laminating the layers together with an adhesive, eliminating the use of solvents and producing a film in just one step instead multiples steps. In this background, our paper relates to the evolution on packaging for foods using patenting documents. A search for patent documents was performed on free patent databases using keywords and IPC CODES related to this technology. As results: (a) 17% of the 21472 documents found are focused on multilayer packaging for food; (b) 10 countries hold more than 90% of patents (37% Japan; 17.5% USA; 9.5% EP and 9.5% WIPO); and, (c) two peaks were perceived on 1990-1991 and 2000-2003. Curiously, these peaks matches, respectively, with the Persian Gulf and Iraq Wars, so the historical tendency is confirmed: "wars also generate scientific and technological innovations".

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