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ACTIVE AND INTELLIGENT PACKAGING OF FOODS

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Active and intelligent packaging may assist in meeting consumer demands for foods of high shelf-life, safety, convenience and affordable through systematic application of scientific expertise and innovation. Active packaging interferes with the product and the packaging atmosphere in order to maintain or improve the quality and safety properties of packaged foods or extend its shelf-life. Active packaging is implemented through systems that control the gaseous atmosphere of the package, such as gas (CO_2 or O_2) emitters or scavengers, systems that control moisture and gas permeability of package, active diffusion of antimicrobials to the packaging atmosphere (volatile antimicrobials) or on the surface of foods via (edible) biopolymers. Intelligent packaging performs functions, such as detecting, sensing, recording, tracing and communicating, in order to facilitate decision making in the management of foods based on their actual safety and quality level. It may be implemented through direct and indirect quality indicators. Direct quality indicators monitor changes in specific quality or safety attributes, such as ethylene production, H_2S release, total volatile basic nitrogen compounds, O_2 reduction, immune-serological reactions, which are due to microbial or enzymatic activity in the food during storage and provide a gradual colour change indicative of the quality or safety decay. Indirect quality indicators are time-temperature indicators (TTIs), which perform “quite” and continuous monitoring of time-temperature history of foods and translate this to a colour change at the same rate as that of the gradual quality or safety decay of food. TTIs can be enzymatic, diffusion, polymerization, photochemicals and microbial ones.

Keywords: Active, intelligent, packaging, TTIs, photochemical

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