

## FOOD PACKAGING APPLICATIONS USING NANOTECHNOLOGY

Ö. Süfer\*

Osmaniye Korkut Ata University, Faculty of Engineering,  
Dept of Food Engineering, Osmaniye, Turkey

Nowadays, not only containing food product but also increasing mechanical properties of wrapping materials and developing food safety are expected from a food packaging. At this stage, nanotechnology starts to play an important role. Basically, nanotechnology is interested in substances whose dimensions are between nearly 1-100 nm. Characteristics of materials are different from conventional ones in this level. Particles used in nanotechnologic packaging applications are mostly based on biopolymers. Biopolymers could be obtained from various ways such as chemical synthesis, bioresources and microorganisms. Carbohydrates (starch, citosan, agar etc.), lipids (fatty acids and waxes) and proteins (wheat gluten, gelatin etc.) are in the group of bioresources. Carbohydrates like pullulan is synthesized by microorganisms. Biopolymers are also procured from biomass like PLA and petrochemicals. Nanotechnology has a wide variety of potential applications in food packaging. Active and intelligent packaging methods are used for this purpose. In active packaging method, elimination of oxygen in the package is aimed, but anaerobic microorganism growth should be also considered. Intelligent packaging predicates on getting information about maintaining food quality such as demonstrating of deterioration. On the other hand, food product conditions could be monitored by indicators, detectors and nanosensors. Another type of nanotechnologic packaging applications called as "Nanocoatings" are applied in order to reduce microbial population. Although advantages of nanotechnology are known well, migration of particles from package to food, toxic effects on human health and degradation mechanisms in soil have not studied efficiently and understood clearly.

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\* Corresponding author: ozgesufer@osmaniye.edu.tr