Edible protective films and coatings in food industry.

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Introduction

Microorganisms contaminate foods causing food spoilage and poisoning. Therefore, inactivation or inhibition of undesirable microorganisms in food is important to assure safety of foods [1]. Debeaufort and Voilley indicate that the qualities of food products are associated with their organoleptic, nutritional and microbiological properties which change during storage. Such changes are caused by interactions between foods and their surrounding environment or by migration between different components within composite food [2]. Various methods can eliminate or reduce microorganisms on food products but many of these techniques cause chemical and physical changes of food products. Many studies have focused on the improvement of antimicrobial active systems through fusion of antimicrobial substances onto the food coatings [3]. Bourtoom write that biocomposites have received significant attention in recent years by reason of their advantages over synthetic films [4]. Janjarasskul and Krochta notice that it is the result of increasing demand for safe, high-quality foods with long shelf life and the awareness that biodegradable protective coatings help in reducing packaging waste [5]. Film and coating are used to identify a material or composition that covers a food surface. However, according to Pavlath and Orts the difference between film and coating is that film is a stand-alone wrapping material, while a coating is created directly on food surface itself [6]. As discussed by Sánchez-Ortega et al. edible films are produced from food grade filmogenic suspensions. Films may take the form of pouches, capsules, casings, wraps or bags [7]. Akhtara et al. show that many edible films prevent moisture losses and quality changes, additionally described films help in control exchange of various gases which appearing in respiration processes. Such biocomposites also prevent loss of different quality components of food product and ensure surface resistance [8]. Šuput et al. indicates that biodegradable polymers should be degraded by microorganisms in composting processes to produce natural breakdown compounds. Edible packaging can be carriers for flavourings, antimicrobial agents or antioxidants, etc. [9]. The coating/film should also ensure sterility of the food surface, therefore antimicrobial biocomposites can be a promising method for providing food safety through preventing pathogens contamination by direct contact of the package with its surface. Successive release of antibacterial substance from the surface coating of the product for a longer period of time seems to be more important than the use of antimicrobial agents in food products. However, even if the coating possesses an antimicrobial effect, other qualities such as sensory properties may change, causing the product to be unacceptable to consumers [6,7].

Handling, storage and transportation are steps which have an influence of dehydration, deterioration, losing flavor and nutritional value of products. Nowadays, combinations of controlled atmosphere storage, refrigeration, and UV sterilization and gamma radiation are methods to ensure our food safe [6]. Introduction of new food product categories, such as safe, convenience and high quality products, reduction the volume of waste through the use of biodegradable polymers which replace synthetic materials are the reasons for investigating edible coatings. The main role of edible coatings is to preserve the high quality of a food product. Edible coatings are applied in active packaging due to their functional properties and because they eliminate or inhibit the growth of microorganisms in food products. Active antimicrobial packages are designed to function when in direct contact with food as they incorporate antimicrobial additives. Many natural substances such as enzymes, bacteriocins and essential oils have been studied for their functional properties as active ingredients for edible package. The selective action of such coatings involves the release of a specific active component during storage which interacts with microorganisms. Edible coatings may be used to prolong the shelf-life of food products, control material exchange, and improve the products' sensory properties, nutritive value and attractiveness [10,11]. The optimization behavior of packaging material on food product is of crucial importance, in order to extend the food shelf-life and to obtain the best engineering solution. It is important to know if there is interaction between food and packaging material. Quality changes must be taken into consideration before application in food products [10,12].

This editorial summarizes the articles in the area of edible films and coatings used in food industry, in the confidence that readers will find this information useful with the most recent research on protective films/coatings from a food microbiology perspective. We sincerely hope that articles will prompt further research and contribute to advance the knowledge on biodegradable films/coatings and to develop novel or improved strategies of food safety.

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