Chapter 8
Probiotic Microorganisms and Encapsulation Method Approaches

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ABSTRACT

Nowadays, interest in probiotics, which are useful and necessary for healthy life, is rapidly increasing, and studies on the beneficial effects of probiotics on human health continue intensely. Every year, increasing efforts to prevent cancer, which has been anticipated, has increased the interest in probiotics and therefore synbiotics. Encapsulation methods are one of the most important protection methods currently used to ensure the viability of probiotics and their effectiveness. Especially milk and dairy products are used for many purposes such as increasing the shelf life, increasing the nutritional value, providing digestibility, shortening the ripening period, improving taste and aroma substances. The use of the microencapsulation technique alone can improve probiotic vitality. Combining microencapsulation with various food processing technologies is thought to help improve the vitality of probiotics in production and storage. In this chapter, probiotic microorganisms and encapsulation applications are explored.
INTRODUCTION

Probiotics and Prebiotics

Probiotics, which are meant for life in Greek, can be described as living microorganisms that balance the intestinal flora when taken in certain amounts with nutrients and affect the host’s health positively. Another name given to probiotics is ‘biogenics’ (Holzapfel & Schillinger, 2002).

Definitions used in the literature for probiotics:

- The probiotic term, consisting of two parts, “Pro” and “biota”, means “for life” and is the antithesis of antibiotics (Patterson & Burkholder, 2003).
- Microorganisms added to foods that affect the host physiology positively by organizing the microorganism and nutritional balance in the intestines, and regulating systemic and mucosal immunity (Coşkun, 2006).
- Probiotics, non-pathogenic-living organisms, are able to reach to the colon since they are resistant to digestion against to the acidic environments of stomach. Thus it can positively affect the human health by influencing microbiota.
- Probiotics are live-food additives that affect the balance of the intestinal microorganisms of the host. (Watson, Preedy, Monedero, & Rodríguez-Díaz, 2016).
- Apart from simple nutritive properties, they are living microorganisms that are beneficial to the host’s health when taken in sufficient quantities (Shah & Lankaputhra, 1997).
- Probiotics are organisms and substances contributing to the intestinal microorganism balance (Watson, Preedy, Likotrafiti, & Rhoades, 2016).

Prebiotics are indigestible components that increase the number and activities of beneficial bacteria living in the gut and the effect of probiotics. The classical definition of the prebiotic is that non-digestible nutrient components which have impacts on the host’s health positively by increasing the number and type of bacteria in the colon. This term was first used by Gibson and Roberfroid in 1995. However, the emergence of prebiotics dates back to the 1950s. György and colleagues described a bifidogenic factor that selectively stimulates the proliferation of bifidobacteria. (Gyorgy, Mello, Torres, & Barness, 1953). Prebiotic food is a food product that contains a prebiotic component. The prebiotic components are oligosaccharides or polysaccharides which are mainly found in the carbohydrate group and generally function as soluble fibers. Prebiotics usually are found in the form of fructose and galactose polymers (Coşkun, 2006). There are four main groups of common prebiotics commonly used in Europe: inulin, fructooligosaccharides, lactulose, galactooligosaccharides. The most common oligosaccharides added to foods are fructooligosaccharides, galactooligosaccharides and polydextrose. Prebiotics affect the composition and activity of intestinal microbiota positively, by regulating intestinal motility, increasing the absorption and bioavailability of minerals, such as calcium and magnesium, and preventing the proliferation of pathogenic microorganisms. In order to define a food component as a prebiotic, it must have the following properties:

- Must be resistant to digestion,
- Must be hydrolyzed by bacteria present in the colon,
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