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Commentary

Fermentation of Probiotics using Immobilized Cell Technology

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DESCRIPTION

Fermentation is immobilized in cell technology that involves the use of live bacteria that are immobilized in a matrix, such as a gel or a bead, and used to ferment a substrate, such as milk or soy, to produce probiotics. The immobilization of the bacteria enhances their stability, prolongs their survival, and allows for their reuse [1]. The process of immobilization involves encapsulating the bacteria in a matrix that is permeable to nutrients and waste products but prevents the bacteria from escaping. The matrix may be made of various materials, such as alginate, carrageenan, or cellulose, depending on the requirements of the fermentation process. Once immobilized, the bacteria are added to the substrate, and the fermentation process proceeds as usual [2]. One of the main advantages of immobilized cell technology is that it enables the continuous production of probiotics. The immobilized bacteria can be reused multiple times, which reduces the cost of production and increases the efficiency of the process. Furthermore, immobilized cell technology reduces the risk of contamination and makes it easier to control the fermentation process. Overall, the use of immobilized cell technology for the fermentation of probiotics offers several advantages over traditional fermentation methods. It allows for the continuous production of probiotics, reduces the cost of production, and improves the efficiency and control of the fermentation process [3].

Probiotic bacteria to many kinds of food products has substantially increased as our understanding of the intestinal microbiota and its modifying factors has expanded at a rapid rate. A product that contains living microorganisms (mostly lactobacilli and bifid bacteria) in sufficient quantities to change the microflora in a specific compartment of the host and have positive health benefits is referred to as a probiotic [4]. There is mounting scientific evidence that probiotics may help maintain a healthy gut flora, which helps the host in a number of ways. Probiotics, which are of intestinal origin and sensitive to a variety of environmental stressors, including acidity, oxygen, and heat, face major technological obstacles. A probiotic must meet a number of requirements before it can improve human health. A probiotic first needs to have safety and health benefits that have been verified by science. In order to be produced on a large scale and incorporated into food products without losing viability, functionality, or producing an unpleasant flavour or texture, it should also have good technological properties. A probiotic must also have high survival rates in food products throughout storage and in downstream processes (such centrifugation and drying). Together with high activity in the gut environment, high viability and survival in the upper gastrointestinal tract are important prerequisites [5-7].

A crucial factor in the development of probiotic foods is the bacteria' vitality. Although the precise number of cells needed to have therapeutic effects is unknown and may vary depending on the strain and desired health effect, a minimum of 106 live probiotic bacteria per milliliter or per gramme of food product is generally acknowledged [8,9]. The survival of probiotic bacteria before they reach the target site of the host is impacted by a number of circumstances. Many surveys have revealed significant variations and low viability of probiotic bacteria in food, despite the significance of vitality. The majority of technological factors are currently taken into account when choosing commercial strains, which excludes some strains with promising health characteristics. Because many intestinal strains are difficult to multiply and high survivability is vital for both economic and health impacts, there is a continuing strong industrial demand for novel methods that enable high cell yield at large scale and maintain probiotic stability in food. Also, the introduction of strains that are not compatible with technology could result in increased product efficacy and strain variety [10].

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