

FACTORS AFFECTING CELL VIABILITY ON THE PRODUCTION OF LYOPHILIZED STARTER CULTURE

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The successful manufacture of all fermented products relies on the presence, growth and metabolism of specific microorganisms. Starter culture consists of microorganisms that bring about desired changes in the final product. These changes may include novel functionality, enhanced preservation, reduced food safety risks, improved nutritional or health value, enhanced sensory qualities and increased economic value. Different processes, such as freezing and freeze-drying have been used to preserve starter culture. Lyophilized cultures have advantage of lower transport and storage costs, so lyophilization is one of the most common processes for the production of large amounts of concentrated microbiological cultures. However, during this process, bacteria are subjected to adverse conditions, such as water crystallization, low temperatures, protein and DNA denaturation, cell membrane damage, loss of reproductive capability and viability. In this context, factors affecting cell survival and viability during lyophilization are growth conditions, osmoprotectants, cryoprotectants, freezing, drying medium, rehydration, storage atmosphere, storage conditions, species and strains of microorganism, and initial microorganism concentration. To prevent or reduce these adverse effects, cryoprotective agents are commonly added prior to freeze-drying. A good protectant should be easily dried, and provide a good matrix to allow stability and ease of rehydration. Polyols, polysaccharides, disaccharides, amino acids, proteins, minerals, salts of organic acids and vitamins-complex media have been tested for their protective action. As a result, the most important factors that have impact on cell viability and density are cryoprotectant media, growth conditions and storage conditions.

Keywords: Starter culture, lyophilization, cell viability

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