Formulation of protective agents for improvement of lactobacillus salivarius I 24 survival rate subjected to freese drying for production of live cells in powdered form

ABSTRACT

The effectiveness of formulations using different protective agents to maintain viability of Lactobacillus salivarius I 24 during freeze drying for production of live cell in powdered form was investigated. The influence of prefreezing and cultivation conditions on viability of cells after freeze drying was also studied. Surface methodology was used to determine the most suitable combination of the protective agents. Concentrations of skim milk, sucrose, glycerol, and calcium carbonate were selected as operating variables, and survivals of cultures after freeze drying were used as results. Skim milk and sucrose were better protective agents than glycerol and calcium carbonate when used individually for preserving L. salivarius I 24 during freeze drying. Their protective abilities could be enhanced significantly when using them as a mixture (9.85% w/v skim milk and 10.65% w/v sucrose). Prefreezing of the cells at −80°C for 5 h prior to freeze drying and cultivation with regulated pH and temperature gave the highest cell viability.

Keyword: Freeze drying; Protective agent; Live microbial cells; Lactobacillus salivarius