Strategies in fed-batch cultivation on the production performance of Lactobacillus salivarius I 24 viable cells

ABSTRACT

The potential use of fed-batch cultivation (FBC) for improvement of the production of Lactobacillus salivarius I 24 biomass for subsequent use as probiotics was studied using a 2-L stirredtank bioreactor. Three different constant feeding rates (0.1, 0.05, and 0.033 L/h) were applied in FBCs and their effect on carbon metabolism was evaluated. The carbon flux for cell built-up with reduction in lactic acid synthesis was observed in the fed-batch as compared to the batch cultivation mode. The viable cell number obtained in the constant FBC (CFBC) operated at a feeding rate of 0.05 L/h was 8 times higher \((10.7\times10^{10} \text{ CFU/mL})\) than that recorded in the batch cultivation. This gave the viable cell yield based on glucose consumed for CFBC of 26 times higher \((11.3\times10^{12} \text{ CFU/g Glucose})\) than the batch cultivation. This study demonstrated CFBC, which is simple with minimal use of process control equipment, has an industrial potential for improvement of probiotic production.

**Keyword:** Fed-batch cultivation; Lactobacillus salivarius; Lactic acid bacteria; Probiotics; Carbon metabolism