

Abstract

A process that was developed for protection of immobilized cells against inhibitory substances in the fermentation medium was applied for ethanol and lactic acid production with neither sterilization of the media, fermentor and other apparatus nor filtration of the aeration gas. The process involves co-immobilization of the fermentation micro-organism with castor oil and suppression of contaminant growth by addition of an anti-microbial substance to the fermentation medium. When 0.1% n-butyl, p-hydroxybenzoate (POBB) was added to the medium, ethanol and lactic acid productions were stable for 60 h and 70 h, respectively, while growth of the contaminants was completely suppressed. Longer process stability was achieved when POBB was replaced with Preventol GD, which has higher partition coefficient between castor oil and water. In this case, both glucose consumption and ethanol production were stable for 140 h. The possibilities of increasing the process stabilities were discussed.

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