

Enhanced butyrate production by cyclic-addition of adsorbent in a fed-batch culture of *Clostridium tyrobutyricum*

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In butyric acid fermentation, a high concentration of butyric acid is a key factor which makes the recovery of the product economically. However, toxic effects of acid prevent the cell from producing ca. 50 g/L in batch or fed-batch process. To solve this problem, several in-situ recovery processes have been developed. Ion-exchanger and adsorbent are able to remove organic acid, but its low adsorption capacity together with the inhibitory effects on the cell growth when using large amount of ion-exchanger must be addressed. In our research, cyclic addition of ion exchanger lower than its inhibition concentration solved these problems in fed batch fermentation. The removal of butyric acid in each step reduced cell toxicity from the acid and maintained the acid production without the hindering effects of the resin. The total concentration of butyric acid was increased 20% more than that in fed-batch culture in the absence of ion-exchanger.