Production of Propionic Acid for Antifungal Activity by Calcium alginate Immobilization of *Propionibacterium acidipropionici* TISTR 442 Using Whey as Substrate

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ABSTRACT

The improvement of propionic acid production, as fermenting by calcium alginate immobilized cells of Propionibacterium acidipropionici TISTR 442 and using whey as substrate was investigated. The highest amount of propionic acid was produced by adjusting the distance between the tip of the tube and the surface of $CaCl_2$ solution to be 4 - 6 cm and the flow rate of the gel solution to be 7 ml/min. Fermentation by immobilized cells in 2-l fermentors using1% $CaCO_3$ and 5 N KOH to control the pH at 6.5 gave the highest amount of propionic acid 29.24 g/l and consistent potential to recycle 2 rounds of fermentation by producing the total amount of 15.85$\pm$0.25 g/l and 13.39$\pm$0.25 g/l propionic acid from Batch 1 and Batch 2 fermentation, respectively. Which one amount of propionic acid was higher than that from free cells in 2-l fermentors at 216 h of the fermentation time. The fermented propionic acid as well as the commercial propionic acid from chemical processes were able to inhibit the growth of the fungal tested.

Key words: Immobilization, Whey, *Propionibacterium acidipropionici*, Antifungal activity