Studies on Poly(γ -glutamic acid) Production by Bacillus licheniformis in Fed-batch Flask Cultures

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ABSTRACT

The object of this study is to study γ -poly(glutamic acid) (γ -PGA or PGA) production by Bacillus licheniformis CCRC 12826 in fed batch flask culture, to investigate the component concentrations if feeding medium and the feeding time for the high γ -PGA production. The γ -PGA production was 34.5 g/L when B. licheniformis was cultured in the 50mL modified medium in 250mL flask with the initial pH6.5 at 37°C shaker (150rpm) for 120h of cultivation. When the 25mL feeding medium containing glutamic acid (40 g/L), citric acid (42 g/L), glycerol (158 g/L), NH4Cl (1 g/L) was fed in the culture medium after 20h of cultivation, the γ -PGA yield was only 24.5 g/L. If the volume of the feeding medium was reduced from 25mL to 5mL, the component concentrations should become 200 g/L glutamic acid, 210 g/L citric acid, 790 g/L glycerol, 5 g/L NH4Cl. When this concentrated feeding medium was fed as described above, the γ -PGA yield became 33.5 g/L for 120h of cultivation. The overall γ -PGA product isolated after in cultivation of 144h was 45.3 g/L. The time for the highest γ -PGA production was delayed, but the feeding process was worth using to improve the γ -PGA yield.

Keywords : Bacillus licheniformis, γ -poly(glutamic acid), fed-batch.

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