溫度變化對Ralstonia eutropha於限氮條件下生合成PHB之影響

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摘 要

聚羥基烷酯類為一完全生物可分解性塑膠材料，可由多種細 菌於碳源充足而某種營養素限制的環境下來生合成，其性質與傳 統塑膠材料－聚丙烯之性質相似，因而被廣為研究。 本研究以微生物發酵法來生產PHB（polyhydroxybutyrate）， 測試的菌株為Ralstonia eutropha，在氮源限制的生長環境，於 不同溫度（26、30及35°C）下進行批次發酵培養，探討菌體量、PHB的產量及碳源與氮源基質消耗的影響。實驗結果顯示，於 35°C培養時，PHB的產率為最高，約0.099 g/L．h。每克葡萄糖 碳源基質平均生產之PHB量，以培養於26°C時為佳，約為0.20 gPHB/gGlucose。其代謝酸分析結果，培養於26°C時，以檸檬酸之 產率最高，約0.136 g/L．h；培養於30°C時，亦以檸檬酸之產率 為最高，約0.157 g/L．h；而培養於35°C時，則以乙酸之代謝產 率為最高，約0.109 g/L．h。 在30°C限制氮源之連續式發酵的培養，於最初以批次發酵進 行培養菌體，當菌體生長尚未進入對數生長期時，改以連續式發 酵培養，稀釋速率（D）分別0.3028、0.2335、0.1918及0.1213 h-1。由實驗結果得知，培養於D = 0.1213 h-1時，PHB產率為最高， 約0.028 g/L．h。而菌體產率則以在D = 0.2335 h-1培養時為最 高，約為0.067 g/L．h。

關鍵詞 : PHB ; Ralstonia eutrophus ; 限氮 ; 批次發酵 ; 代謝酸 ; 連續式發酵 ; 稀釋速率

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