利用實驗設計最適化及模式化Candida tropicalis的比生長速率

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摘 要

Candida tropicalis可用來生產木糖醇、酒精及α,ω-dicarboxylic acid等具有經濟效益之產物；同時它也具有降解酚及甲酚之能力，可以用來做為污水處理之菌株。本研究目的在應用有效率之方法，尋求此菌株最佳之比生長速率，決定菌體醱酵時的最佳操作條件。所謂有效率的方法是指綜和二因子實驗、陡升路徑與中心混成實驗等實驗設計而成的回應曲面法。一般以批次醱酵搜尋最佳條件方法，實驗過程中各參數是隨時間不斷地變化。但本研究採用連續操作，使所識別出之比生長速率是確保於特定之測試條件。研究選定溫度及基質糖濃度作探討因子。其中為了維持連續醱酵操作能夠控制在設定的條件，並能在不穩定的區域中進行操作，故需要施以回饋控制。而控制器是以一個經過驗證的控制器諧調法則進行參數調諧。此組控制器可將連續式醱酵維持於化學恆常 (chemostat)，使溫度及糖濃度控制在設計實驗的條件上。經由反應曲面實驗設計結果，C. tropicalis之比生長速率 (μ) 與溫度 (T) 及糖濃度 (S) 之關係為 μ = －240.31－8.15S + 15.88T－0.296S2 －0.245T2 + 0.317ST。預測最大比生長速率大約出現在糖濃度在5.5 g L-1以及溫度35.9oC之條件下，其預測值為0.687 h-1，而同條件下實際操作之結果為0.701 h-1，成功找到最適條件。而此條件下連續醱酵的產率為0.27 g/g glucose，與批次醱酵幾乎相同。

關鍵詞 : 熱帶假絲酵母菌 ; 二階段醱酵 ; 連續式醱酵

目錄

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