利用 Agrobacterium sp. 菌株生產 Curdlan 之研究

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摘 要

Curdlan為β-1,3鍵結的葡萄糖所構成之非水溶性多醣體，大多由Agrobacterium sp.及Alcaligenes faecalis於氮源限制條件下合成。而本研究利用Agrobacterium sp.發酵來生產curdlan。探討五種不同碳源(葡萄糖、蔗糖、果糖、乳糖與麥芽糖)及四種不同氮源(氯化銨、硝酸鈉、尿素與酵母萃取物)。實驗結果顯示蔗糖和尿素各自為最有效生產curdlan之碳源和氮源。另外，也探討溶氧量對curdlan生產之影響。當曝氣量從0.5 L/min增加到2.0 L/min，其結果顯示菌體濃度及curdlan產量皆會增加。同時，並研究調節pH值對curdlan生產之重要性。當pH值為6.6時有最高的比細胞生長率，pH值為5.5時有最高的比curdlan生產率。由此可知，控制培養條件來增加curdlan生產率與降低curdlan生產成本是相當重要的。最後，將純化之產物進行FT-IR(fourier transform infrared)與NMR(nuclear magnetic chromatography)分析來確定產物之結構，結果顯示已知此產物確定為curdlan。 在單一因子實驗中，已知培養基組成中蔗糖濃度、尿素濃度及pH值為影響Agrobacterium sp.生產curdlan最重要的因子。因此，本研究主要利用回應曲面實驗設計法進行Agrobacterium sp.生產curdlan之培養基最適化。使用中心混層設計來探討蔗糖濃度(56- 224 g/L)、尿素濃度(0.05- 4.75 g/L)及pH(4-11)之間複雜的關係。於最佳的培養基組成中，蔗糖濃度為142.9 g/L，尿素濃度為0.52 g/L及pH為7.5磷酸緩衝溶液，其預測curdlan產量為5.22 g/L，比未最適化之培養基高9.6％。

關鍵詞 : Agrobacterium sp.，curdlan，中心混層設計，回應曲面法

目錄

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