# 以批次醱酵槽生產聚麩胺酸及其抗凍性之研究


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**摘 要**

本研究係以醱酵槽探討B.licheniformis CCRC 12826生產聚麩胺酸最佳條件，採用逐步固定法之方式，探討曝氣量、攪拌速度、pH值對聚麩胺酸產量影響，並於培養期間探討碳源消耗，溶氧，黏度，細胞生長及聚麩胺酸產量變化，以找出聚麩胺酸之最適生產條件。 結果顯示在pH=6.0時最適合菌的生長，而在pH=6.5時則較適合聚麩胺酸之生合成。於攪拌速度之探討中發現在100rpm時，由於基質質傳速率慢且菌量生長緩慢，導致聚麩胺酸的產量不高，而在300rpm時，雖然其基質消耗快速，但是可能因轉速快而造成聚合酉每不易產生或是易被破壞，因此產量相對較低，200rpm最適合聚麩胺酸的聚合。於曝氣量的變化中，以曝氣量(3L/min)的產量最高，其產量較曝氣量(2L/min)多了33%。總之，本研究發現當B.licheniformis CCRC 12826培養於培養基F(NH4Cl 7.0(g/L) , K2HPO4 0.5(g/L) , MgSO4・7H2O 0.5(g/L) , FeCl3 ・6H2O 0.04(g/L) , CaCl2・2H2O 0.15(g/L) , MnSO4・4~6H2O 0.104(g/L), Citric acid 22(g/L), Glutamic acid 65(g/L), Glycerol 170(g/L))，於pH=6.5，攪拌速率200rpm，曝氣量(3L/min)之10L醱酵槽中，所得之最佳產率為25.93g/L，較搖瓶培養時增加了23%。 除運用醱酵槽生產聚麩胺酸之外，所得之聚麩胺酸則進行抗凍性之研究。我們製備不同的光學異構，不同分子量及各種金屬鹽(鈉、鉀、鎂、鈣)之聚麩胺酸並探討其分子結構與抗凍活性之關係。 結果顯示不同光學異構組成之聚麩胺酸之抗凍活性是相似的，顯然光學異構不影響聚麩胺酸抗凍活性。在不同分子量之聚麩胺酸方面，分子量越小者其抗凍活性越高，而在分子量為15,151時，其抗凍活性(AF)達到了5.57。在不同金屬鹽之聚麩胺酸中，其抗凍活性為Mg >Na ?Ca >K，這趨勢與無機金屬鹽之抗凍性相似，即高離子電荷具高抗凍性，然而如何解釋分子結構與抗凍性之反應機構則尚待研究。



關鍵詞 : 聚麩胺酸 ; 抗凍性


**目錄**

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