環境因子對獸疫鏈球菌發酵產程生成透明質酸之影響

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摘 要

透明質酸 (hyaluronic acid，簡稱HA) 是由葡萄糖醛酸(D-glucuronic acid) 和 N-乙醯氨基葡萄糖 (N-acetyglucosamine) 雙糖單位重複建構而成的，因具有特殊生物相容性、保濕能力和獨特的流變學特性，目前已廣泛應用在生物醫學、化妝品工業等領域上。本研究係利用獸疫鏈球菌 (Streptococcus zooepidemicus) 菌株培養生成 HA，探討葡萄糖濃度、攪拌、曝氣和額外添加物對 HA 生產之影響；並探討轉速和曝氣速率對氧氣質傳係數 (kLa) 的影響。實驗結果顯示葡萄糖以 20 g/L 最高所得之 HA 產量最高，HA 產量為 0.61g/L，此時約有30 % 的葡萄糖被消耗並轉化成 HA 和菌量，此可知培養基中適當的葡萄糖濃度存在有助於 S. zoopidemicus 菌株生長，並且提升 HA 產量。在攪拌和間接曝氣實驗的探討中，則是以間接曝氣培養優於攪拌培養，且間接曝氣條件為不曝氣 (An)- 曝氣 (A) 為 24h-24h 時能獲得最高的 HA產量 (0.61 g/L)；結果亦顯示出的 kLa 變化確實會受到轉速和曝氣速率的影響，但不是主要影響 HA 生產的因素。但在添加物方面，實驗結果顯示皆對 HA 產量影響不大。而培養基之 pH 的調控上，則有助菌體生長和 HA 產量增加。另外，亦發現菌落型態亦會影響 HA 含量。最後，將純化之產物進行 FT-IR、NMR及 GPC 分析來確定產物之結構及分子量範圍，結果顯示此產物確實為 HA。 在固定化細胞方面，製備 alginate、PAA 和 PVA 菌體顆粒，進行重複批次試驗，結果發現以 PVA 顆粒最適合作為日後培養之固定化基材。

關鍵詞 : 透明質酸 ; 獸疫鏈球菌 ; 固定化

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