額外添加物對獸疫鏈球菌 Streptococcus equi subsp. zooepidemicus HAWU 發酵生產透明質酸之影響

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摘 要

透明質酸(Hyaluronic Acid, 簡稱HA)是由glucuronic acid和N-acetylglucosamine的重複單位藉由β-1,3和β-1,4鍵交互鍵結而成的高分子量聚合體。商業上，HA是從雄雞雞冠萃取出來或由微生物發酵生產。因為HA具有特殊生物相容性以及保濕能力。目前已廣泛的應用在生物醫學、化妝品工業等其他相關領域。商業上，HA是從雄雞雞冠萃取出來或由微生物發酵生產。因為用動物萃取出來的產品會有汙染方面的問題，所以，目前HA會變的比較偏向由發酵生產所得到。因此本研究主要探討額外添加物對突變streptococcus equi subsp. zooepidemicus (命名為S. equi subsp. zooepidemicus HAWU)菌株生產HA之影響。本研究可分為三個部分，分別如下： 第一部分利用搖瓶與5 L發酵槽，探討額外添加物(乳酸、黃豆萃取液、過氧化氫)對S. equi subsp. zooepidemicus HAWU 菌株發酵生產HA及其分子量之影響。在搖瓶部分，在溫度37°C且轉速150 rpm條件下，可得HA產量為4.58 g/L。在5 L發酵槽部分，在溫度37°C、轉速300 rpm且曝氣為1 vvm條件下，當額外添加物時，可得到最大產率為(1.0) g/h/L。 第二部分為利用動力學解析S. equi subsp. zooepidemicus HAWU菌株生長、HA之生成以及葡萄糖消耗，作為之後放大生產之參考依據。實驗結果顯示，添加與未添加H2O2的理論值以及實際值之間雖有點差異，但本研究之微生物生長模式、產物形成模式以及基質消耗模式可合理且準確地模擬出S. equi subsp. zooepidemicus HAWU的生長、HA生成以及葡萄糖消耗情形。另外，根據Luedeking-Piret equation，HA之生產行為模式為以生長相關為主之混合生長相關模式(mixed growth-asscoiated model)，這也間接證明HA屬於主要代謝產物(primary metabolites)。 第三部分為比較本實驗所純化出之HA與市售HA之吸水性及保水性。吸水及保水性測試上可分為兩個部份，結果顯示本實驗所純化出之HA與市售HA之吸水性及保水性並無很大的差異。

關鍵詞 : 透明質酸、保水性、吸水性

目錄

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