利用Bacillus subtilis DYU1 生產聚麩胺酸並進行聚麩胺酸絮凝作用之探討

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摘 要

本研究是利用自行篩選菌株Bacillus subtilis DYU1作為聚麩胺酸(γ-PGA)生產菌株，於搖瓶中探討不同培養基組成以及培養條件對於γ-PGA生產之影響。培養基中麩胺酸添加濃度為30 g/L時，可以獲得最佳的γ-PGA產量為32.1 g/L。利用B. subtilis DYU1生產γ-PGA的最適溫度介於35 – 38 ℃之間。於培養基中添加具有高營養成分的混合胺基酸溶液，無法有效提升γ-PGA產量。另一方面，也在5公升發酵槽中，探討了攪拌速率及曝氣量對於γ-PGA發酵生產的影響。此外，為了降低γ-PGA的生產成本，實驗於搖瓶中，利用糖蜜廢液作為基礎生產培養基，並希望藉此達到減廢的目的。結果顯示出，糖蜜具有作為γ-PGA生產培養基的潛力。本研究探討不同pH值和溫度之γ-PGA發酵液流變學行為，亦發展一套與溫度和γ-PGA濃度相關，且對γ-PGA發酵液外觀黏度影響之數學模式。此研究也探討了γ-PGA應用作為保溼劑以及絮凝劑的可行性。結果顯示，γ-PGA具有高度的吸水及保水性，且於溶液狀態時具有高度的保水性。利用3種γ-PGA以及聚氯化鋁(Polyaluminum Chloride)，分別作為絮凝劑以及助凝劑，進行Escherichia coli的絮凝實驗。結果顯示，利用B. subtilis DYU1所生產的γ-PGA，對於E. coli具有良好的絮凝能力。此外，利用實驗所獲得的結果，模擬出γ-PGA的絮凝過程之機制。

關鍵詞 : 聚麩胺酸、發酵槽、糖蜜廢液、流變學、絮凝

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