以化學法及微生物法生產r-聚麩胺酸之衍生物及其應用

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摘 要

聚麩胺酸是經由微生物發酵生產的天然生物性材料，其具有水溶性、生物可分解與可食等特性，且聚麩胺酸本身及其分解物對人體與環境無毒害，目前聚麩胺酸已知可應用於食品、化妝品、醫藥材料、環境保護等領域，因此工業化大量生產聚麩胺酸此一對環境友善之生物性材料，對於環境及環境保護將有相當的貢獻。 本研究以十升發酵槽培養Bacillus subtilis C1並探討pH、曝氣量、葉片轉速對菌株生長、聚麩胺酸產量的影響，當Bacillus subtilis C1培養於T1培養基中（Glycerin：17 %、Citric acid：2.2 %、NH4Cl：0.7 %、K2HPO4：0.05 %、MgSO4．7H2O：0.05 %、CaCl2．2H2O：0.015 %、FeCl3．6H2O：0.004 %、MnSO4．4~6H2O：0.0104 %），發現發酵槽條件為pH=6.00、曝氣量為5、葉片轉速為150rpm、37℃下培養84小時，聚麩胺酸最高產量為8.25g/L，約為搖瓶培養生產聚麩胺酸的1倍（平均產量4.36g/L），Bacillus subtilis C1所生產之產物經結構鑑定證實為聚麩胺酸與甘油之共聚物，其光譜圖中化學位移1.8-2.1（m,β,2H）、2.3-2.4（b,γ,2H）、4.1-4.2（b,α,1H）代表γ-聚麩胺酸各波?之位移，而化學位移3.50-3.54（dd,2H）、3.60-3.62（dd,2H）、3.72-3.77（m,1H）相當於甘油各波?之化學位移。此產物之分子量為2,929,844。 本研究亦探討聚麩胺酸衍生物之吸水性應用，使用Bacillus licheniformis CCRC 12826菌株所生產聚麩胺酸，並利用化學方法偶合聚麩胺酸與環氧樹脂以交聯形成結構堅固之凝膠，並測試其吸水性，實驗發現2.5 %聚麩胺酸溶液於pH值為5.33與150μl環氧樹脂進行反應4天，所得之凝膠可達到吸水重為乾凝膠重的50~60倍，吸水性較其它條件製備之凝膠優越。 不同吸水材料之吸水實驗中，發現Bacillus subtilis C1所生產之聚麩胺酸-甘油複合物於30分鐘吸水實驗中，其吸水重為乾凝膠重之26倍，然而較長時間之吸水，此材料即完全溶解。

關鍵詞 : 聚麩胺酸、交聯、水凝膠

目錄

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