酵素固定化法轉換植酸為肌醇之研究

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摘 要

由 Aspergillus ficuum 所純化之植酸?（E.C.3.1.3.8）能將植酸 水解為肌醇。本實驗改變以往的判別法，利用高效液相層析儀（HPLC）來 定量此催化反應，研究以植酸為基質及肌醇生成速率為活性的各項性質， 得到酵素之最適溫度為 50 ℃ 左右，最適 pH 則在 5 附近，在此條件下 最大活性為 95.928 sec-1，與親和性有關的 Km 為 2.337×10-2 M，而 肌醇的產率約為 79.32 %。選擇食用明膠為擔體，欲將 A. ficuum 植酸 ?固定化，於系統中改變數種不同因素，測得最佳固定化條件，即利用 2.5 %戊二醛水溶液為交聯劑與偶合劑，與未成形之明膠於室溫下反應 90 分鐘，以增加其組織堅硬度，再將此明膠顆粒加入酵素溶液中，在 4 ℃ 下連接 12 小時，最後可得到每克擔體上有 0.068 毫克的酵素乾重， 此條件之最佳固定化率為 51 %。取此最佳交聯擔體進行固定化酵素反應 的測試，於相同的定性、定量方法下，發現固定化後的最適 pH 與未固定化的比較並無明顯改變，但卻提高其耐高溫的能力，最適溫度上升約 10 ℃。在動力學常數方面，其Km 增加為 3.276 ×10-2 M，在個別最適條件 下，固定化後之活性為游離酵素的 34.58 %，而肌醇的產率則減少為 23.06 %。

關鍵詞 : 植酸酶 ; 高效液相層析法 ; 植酸 ; 肌醇 ; 固定化酵素

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