以聚麩胺酸為擔體探討脂解酵素 AY 共價固定化之研究

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摘 要

有效的酵素固定化技術能夠使脂解酵素在工業上應用獲得更好的產率與操作穩定性。近年來酵素 固定化技術已趨於成熟，但是對於探討固定化最優化條件之文獻卻是很少見。所以，本研究分別 以吸附法與共價鍵 結法將脂解酵素AY 固定化在矽藻土(Celite)和聚麩胺酸(Poly γ -glutamic acid, γ PGA)。以反 應曲面法(Response surface methodology)和三階三變部分因子實驗設計來探討固定化過程中之變 數：固定化時間、固定化溫度和酵素/擔體比值對比活性(Specific activity)之影響， 並藉由等 高線圖(Contour plots)的分析找出脂解酵素AY 之最優化固定化條件。 由反應曲面回歸分析，在兩種不同的固定化方法中分別取得最佳的固定化條件。吸附法的研究中， 最佳的固定化條件為：固定化時間為59.1 min、固定化溫度約10.7 ° C、酵素/擔體比值為0.5 時， 可獲得最高比活性18.2 U/mg-protein 與比活性率 34.1%；在共價鍵結的研究中，先以EDC 作為活化擔體之活化劑，而最佳的固定化條件為：固定化時 間2 h、固定化溫度約0 ° C、酵素/擔體比值為0.1 時，可獲得最高比活性96.4 U/mg-protein與比活性 率180.9%。 以上實驗結果顯示，脂解酵素AY 固定化在聚麩胺酸所產生之活性明顯高於固定於矽藻土與自由酵素，此現象能夠推論脂解酵素AY-γ PGA 在工業放大規模應用上應可獲得更高之產率。

關鍵詞 : 吸附法 ; 共價鍵結法 ; 固定化 ; 脂解酵素AY ; 最優化 ; 聚麩胺酸

目錄

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