以基因重組 Candida rugosa 脂肪同功酵素探討左旋薄荷醇衍生物之最優化合成條件

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摘 要

左旋薄荷醇為一種芳香化合物，被廣泛應用於食品、香水、化妝品、醫藥等行業。為了提高其在水中的溶解度及更持久的清涼性和熱穩定性於各種工業應用，本研究預計使用具不同生化特性之基因重組Candida rugosa lipase (CRL)同功酵素（LIP1~LIP 4）作為生物觸媒，進行外消旋薄荷醇及乙酸乙酯之酯化反應。我們的目標是篩選出具有高光學專一性的重組同功酵素，並估計各種反應參數對的影響，如反應溫度30~40℃、反應時間2~11天、酵素添加量0.05~0.5 U、基質莫耳比1:1~15:1 (乙酸乙酯:外消旋薄荷醇)、基質階梯式添加 1 (莫耳/天)、共溶液比3:1 (正己烷:甲苯)對高光學純度左旋乙酸薄荷酯的生產。 從結果可知，基因重組LIP 4在合成左旋乙酸薄荷酯的產率比較時，其光學專一性高於其他同功酵素。而其最優化條件為:溫度35 ℃、時間3天、基質莫耳比為8:1 (乙酸乙酯:外消旋薄荷醇； 莫耳/莫耳)、酵素活性0.4 U、基質階梯式添加為1(莫耳/天)、共溶液比為3:1 (正己烷:甲苯)。以此條件的實際實驗值為52.62± 0.4%、鏡像過剩比值為100%，此產率約為商業化lipase AY的1.5倍。

關鍵詞 : 脂肪酵素、立體專一性、薄荷醇、同功酵素

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