

# Optimal Production of l-menthol Derivatives Catalyzed by Recombinant *Candida rugosa* Lipase Isozymes

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## ABSTRACT

L-menthol, an aromatic compound, was widely used in food, perfume, cosmetics, and pharmaceutical industries. To improve its solubility in water, permanence of refreshing and thermostability for various industrial applications, in this study, we planned to catalyze enantioselective esterification of racemic menthol and ethyl acetate by using recombinant *Candida rugosa* lipase isozymes (LIP1~LIP4) as biocatalyst. Our aims were to obtain a recombinant isozyme with highest optical specificity and to estimate the effect of various reaction parameters such as Reaction temperature 30~40 °C, Reaction time 2~11days, Substrate molar ratio 1:1~15:1 (ethyl acetate : dl-menthol), Enzyme total activity 0.05~0.5 U, ethyl acetate was added stepwise by 1 mole/day, Cosolvent ratio 3:1 (n-hexane : toluene) on high optical purity of l-menthyl acetate production. The result shows that recombinant LIP 4 exhibited a higher enantioselectivity and production yield of menthyl acetate than other isozymes. The optimum synthesis conditions were as follows : Reaction temperature 35 °C ; Reaction time 8 days; substrate molar ratio 8:1 (ethyl acetate : dl-menthol); total enzyme activity 0.4 U; ethyl acetate was added stepwise by 1 mole/day; cosolvent ratio was 3:1 (n-hexane : toluene). The actual experimental value was 52.62 ± 0.4%, enantiomeric excess 100%, the molar conversion was about 1.5 fold higher than that of commercialize *Candida rugosa* lipase AY.

Keywords : Lipase、Enantioselective、Menthol、Isozymes

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