

Enzymatic synthesis of betulinic acid ester as an anticancer agent : optimization study.

ABSTRACT

Immobilized *Candida antarctica* lipase, Novozym 435, was used to catalyze the esterification reaction between betulinic acid and phthalic anhydride to synthesize 3-O-phthalyl betulinic acid in n-hexane/chloroform. Response surface methodology based on a five-level, four-variable central composite rotatable design was employed to evaluate the effects of synthesis parameters such as reaction time, reaction temperature, enzyme amount and substrate molar ratio on the yield of ester. Based on the response surface model, the optimal enzymatic synthesis conditions were predicted to be: reaction time 20.3 h, reaction temperature 53.9°C, enzyme amount 145.6 mg, betulinic acid to phthalic anhydride molar ratio 1:1.11. The predicted yield was 65.8% and the actual yield was 64.7%.

Keyword: Response surface methodology; Central composite rotatable design; Enzymatic synthesis; Esterification; Betulinic acid.