High yield lipase-catalyzed synthesis of Engkabang fat esters for the cosmetic industry.

ABSTRACT

Engkabang fat esters were produced via alcoholysis reaction between Engkabang fat and oleyl alcohol, catalyzed by Lipozyme RM IM. The reaction was carried out in a 500 ml Stirred tank reactor using heptane and hexane as solvents. Response surface methodology (RSM) based on a four-factor-five-level Central composite design (CCD) was applied to evaluate the effects of synthesis parameters, namely temperature, substrate molar ratio (oleyl alcohol: Engkabang fat), enzyme amount and impeller speed. The optimum yields of 96.2% and 91.4% were obtained for heptane and hexane at the optimum temperature of 53.9 °C, impeller speeds of 309.5 and 309.0 rpm, enzyme amounts of 4.82 and 5.65 g and substrate molar ratios of 2.94 and 3.39:1, respectively. The actual yields obtained compared well with the predicted values of 100.0% and 91.5%, respectively. Meanwhile, the properties of the esters show that they are suitable to be used as ingredient for cosmetic applications.

Keyword: Engkabang fat esters; Response surface methodology; Central composite design; Alcoholysis; Stirred tank reactor.