

Optimisation of enzymatic hydrolysis for concentration of squalene in palm fatty acid distillate

ABSTRACT

BACKGROUND: Squalene was concentrated from palm fatty acid distillate (PFAD) in this study using commercial immobilised *Candida antarctica* lipase (Novozyme 435®). The PFAD was neutralised (NPFAD) using an alkali to liberate the free fatty acids and then hydrolysed at 65 ± 1 °C. The enzymatic hydrolysis on NPFAD was optimised using response surface methodology (RSM) before being neutralised again to obtain a concentrated squalene fraction. **RESULTS:** A five-level, three-factor central composite rotatable design was adopted to evaluate the effects of the enzymatic hydrolysis parameters reaction time (4-12 h), water content (50-70% w/w) and enzyme concentration (1.5-3.5% w/w) on the percentage yield of squalene concentration. The optimal reaction parameters for maximum yield of squalene concentration were identified from the respective contour plots. The optimal enzymatic hydrolysis conditions were a reaction time of 7.05 h, a water content of 61.40% w/w and an enzyme concentration of 2.23% w/w. **CONCLUSION:** RSM was used to determine the optimal conditions for enzymatic hydrolysis of NPFAD with *C. antarctica* lipase for maximum recovery of squalene which could be implemented on an industrial scale.

Keyword: enzymatic hydrolysis, palm fatty acid distillate, *Candida antarctica*, response surface methodology, squalene