

Pengaruh pelarut n-heksana dan t-butanol terhadap esterifikasi asam lemak hidrolisat minyak sawit dengan sukrosa menggunakan lipase candida rugosa E.C. 3, 1, 1, 3 terimobilisasi pada nanopartikel Fe<sub>3</sub>O<sub>4</sub>- kitosan = The effect of n-hexane and t-butanol solvents on esterification between palm oil fatty acid and sucrose using immobilized candida rugosa lipase E C. 3, 1, 1, 3 on Fe<sub>3</sub>O<sub>4</sub>- chitosan nanoparticles

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Abstrak

Ester asam lemak-karbohidrat dapat dibuat dari reaksi esterifikasi antara sukrosa dengan asam lemak minyak sawit. Reaksi esterifikasi dilakukan secara enzimatik menggunakan lipase *Candida rugosa* bebas maupun terimobilisasi pada nanopartikel Fe<sub>3</sub>O<sub>4</sub>?Kitosan. Hasil sintesis nanopartikel Fe<sub>3</sub>O<sub>4</sub>?Kitosan dikarakterisasi dengan FTIR (Fourier Transform Infra Red). Selanjutnya, lipase diimobilisasi dan diuji persen loading serta aktivitas katalitiknya. Didapatkan persen loading imobilisasi sebesar 31,46%, aktivitas hidrolisis 7,08 U/mL, dan aktivitas spesifik 2,02 U/mg, dengan efisiensi imobilisasi sebesar 4,49%, dan penurunan aktivitas sebesar 95,32%. Pada reaksi esterifikasi menggunakan enzim terimobilisasi dalam pelarut n-heksana dan t-butanol, didapatkan persen konversi ester tertinggi pada rasio sukrosa : asam lemak 1:90 dengan persen konversi masing-masing sebesar 1,23% dan 4,08%.

*Carbohydrate-fatty acid ester can be synthesized by esterification reaction between sucrose and palm oil fatty acid. The esterification reaction was carried out enzymatically using free and immobilized *Candida rugosa* lipase on Fe<sub>3</sub>O<sub>4</sub>?Chitosan nanoparticles. The synthesized Fe<sub>3</sub>O<sub>4</sub>?Chitosan nanoparticles were characterized by FTIR (Fourier Transform Infra Red). The lipase was immobilized and then the loading percentage and the catalytic activity were determined. The loading percentage of the immobilized enzyme was 31.46% with hydrolytic activity of 7,08 U/mL, the specific activity of 2,02 U/mg, the immobilization efficiency was 4.49%, and the enzyme activity was decreased by 95.32%. In the esterification reaction using immobilized enzyme in n-hexane and t-butanol, the highest ester conversion percentage were obtained by using the ratio of sucrose : fatty acid 1:90 with the conversion percentage of 1,23% and 4,08% respectively.*