

Studi pendahuluan esterifikasi glukosa dengan asam lemak hasil hidrolisis minyak sawit menggunakan lipase candida rugosa E.C.
3.1.1.3 terimobilisasi pada nanopartikel Fe3O4-Kitosan = Preliminary study of esterification between glucose and palm oil fatty acid by using immobilized candida rugosa lipase E.C. 3.1.1.3 on Fe3O4-Chitosan nanoparticles

Puri Wulandari R., author

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Abstrak

Ester asam lemak glukosa dapat diperoleh melalui reaksi esterifikasi antara glukosa dengan asam lemak hasil hidrolisis minyak sawit. Pada penelitian ini, reaksi esterifikasi dilakukan secara enzimatik menggunakan katalis lipase Candida rugosa E.C.3.1.1.3 yang terimobilisasi pada nanopartikel Fe3O4-kitosan. Nanopartikel Fe3O4-kitosan disintesis menggunakan metode kopresipitasi antara Fe3+ dan Fe2+, kemudian dikarakterisasi menggunakan FTIR (Fourier Transform Infra Red) dan FESEM (Field Emission Scanning Electron Microscopy). Proses imobilisasi lipase pada nanopartikel Fe3O4-kitosan menggunakan metode ikat silang dengan glutaraldehida sebagai agen pengikat silang. Hasil imobilisasi lipase dianalisis menggunakan FESEM. Analisis dengan FESEM menunjukkan bahwa ukuran rata-rata partikel Fe3O4-kitosan yang dihasilkan berkisar 35 nm. Persentase loading imobilisasi lipase yang diperoleh adalah 84,80%. Aktivitas hidrolisis lipase terimobilisasi sebesar 5,61 U/mg dengan aktivitas spesifik 0,374 U/mg, serta efisiensi imobilisasi sebesar 14,22%. Dari hasil reaksi esterifikasi diperoleh persentase konversi asam lemak sebesar 2,92; 3,33; 3,75; 5,83; dan 8,75 pada penggunaan enzim terimobilisasi berurutan sebesar 5, 10, 20, 30, dan 40% massa substrat.

<hr><i>Glucose fatty acid esters could be produced by esterification reaction between palm oil fatty acid and glucose. In this study, esterification reactions were carried out enzymatically using immobilized Candida rugosa lipase E.C. 3.1.1.3 on Fe3O4-chitosan nanoparticles. Fe3O4-chitosan nanoparticles were synthesized by co-precipitation method between Fe3+ and Fe2+ and then characterized using FTIR (Fourier Transform Infra Red) and FESEM (Field Emission Scanning Electron Microscopy). The process of lipase immobilization on Fe3O4-chitosan nanoparticles was using crosslinking method with glutaraldehyde as crosslinking agent. The immobilization lipase obtained was analyzed by FESEM. FESEM analysis showed that the average particle size of Fe3O4-chitosan nanoparticles produced was around 35 nm. Loading percentage of immobilized lipase was 84,80%. Hydrolysis activity of immobilized lipase was 5,61 U/mg with specific activity 0,374 U/mg and efficiency immobilization was 14,22%. The percentage of fatty acid conversions obtained from this study were 2,92; 3,33; 3,75; 5,83; 8,75 by using immobilized lipase each around 5, 10, 20, 30, 40% of substrate mass.</i>