Thesis Title Application of Fungal Lipase to Modify Palm Oil by Interesterification

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ABSTRACT

Rhizopus delemar grown in a shake-flask culture consisting of 6% peptone, 3% glucose and inorganic salts (0.1% KH_2PO_4, 0.1% $NaNO_3$ and 0.05% $MgSo_4$) for 5 days at 30^0C produced extracellular lipase approximately 1500 unit/ml. The lipase was partially purified by ultrafiltration and CM-cellulose column chromatography and obtained lipase with specific activity 811 unit/mg protein with 16 fold purification and 50% yield. The partially purified lipase preparation showed pH optimum at 6 , temperature optimum at 45^0C, heat stability upto 45^0C and having molecular weight 43,000. The properties of *R. delemar* lipase prepared in this study was similar to that of *R. delemar* lipase from Amano.

R. delemar lipase was immobilized on various supports namely celite, pig bone powder, ENT,ENTP, PU-3

and PU-6. Lipase immobilized on pig bone powder at 50% enzyme loading show highest interesterification activity in the reaction mixture containing palm oil and stearic acid in n-hexane. Optimal conditions for lipase-catalyzed interesterification was at 35°C, pH 5, 6% water content when the ratio of substrates (stearic acid to palm oil) was two (wt/wt) and the enzyme content was 40% of substrate weight . The apparent Km of pig bone-adsorbed lipase for stearic acid was 2.23×10^{-4} M, and Vmax 0.98 mole stearic acid/ mole triglyceride/hr. The maximum percentage of stearic acid in triglyceride of palm oil obtained after 24 hr interesterification was 40-50%. The modified palm oil showed an increase in transition temperature as determined by differential scanning calorimetry.