Thesis Title Studies on fungal lipases for interesterification of palm oil

Name Napawan Promkhatkaew

Degree Master of Science (Biochemistry)

Thesis Supervisory Committee

Prayad Komaratat, Ph.D.

Prapon Wilairat, Ph.D.

Amaret Bhumiratana, Ph.D.

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ABSTRACT

Attempts were made to find out efficient lipase producers from five strains of fungi, namely *Aspergillus niger* 3240, *A. niger* MUCA, *A. niger* 3092, *Mucor* TISTR and *Rhizopus delemar*. Of these, *R. delemar* grown in submerged culture produced lipase of high activity (~800 unit/ml) and *A. niger* 3240 grown on wheat bran-based semi-solid culture also produced subtantial amount of lipase (1400 unit/g medium).

Crude lipase in the culture extract of *A. niger* 3240 had optimal pH at 5, optimal temperature at 30°C and heat stability up to 60°C. The enzyme was purified by ammonium sulfate precipitation followed by DEAE-cellulose and Sephadex G-100 column chromatography. The yield obtained was 43% with 16 fold purification. The partially purified lipase was immobilized on celite for being used in interesterification reaction of palm oil with [1-^{14}C]-stearic acid. The celite-adsorbed lipase had pH stability in the range of 3-9 and catalyzed incorporation of [1-^{14}C]-stearic acid into triglyceride of palm oil at optimum temperature 45°C, optimum pH 3-5 and was favorable to catalyze interesterification of triglycerides having long-chain fatty acid in water-saturated n-hexane.

The immobilized lipase was shown to be able to catalyze interesterification of palm oil with stearic, linoleic and arachidonic acids. The interesterified product analyzed by gas liquid chromatography showed the replacement of palmityl and oleoyl moieties in triglycerides of palm oil with the added fatty acids. Further work is required to improve efficiency of lipase-catalyzed interesterification of palm oil.