

**Lipid Biotechnology of Palm Oil for the Production of Basic
Oleochemicals : Kinetics of Enzymatic Hydrolysis of Palm Oil
by Lipase from *Candida cylindracea* in the Absence
of Emulsifier and Buffer**

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Indonesia is the second largest world exporters of palm oil after Malaysia, constituting about 20 % of total world supply of palm oil. Development programs which have been carried out by the Indonesian government through intensification and extensification of oil palm estates are expected to strengthen the position of Indonesia in the supply of palm oil and palm oil products in the near future. The palm oil has a wide range of applications, i.e. for food as well as industrial purposes, therefore the development of palm oil industries has a positive impact in terms of economic development of this country.

Basic oleochemicals are among many high - value specialty products which can be produced from fat/oil by enzymatic process. Basic oleochemicals are becoming strategic commodities due to fast development of health care, cosmetics and pharmaceutical industries.

This study is aimed to develop a system of enzymatic hidrolisis of palm oil by lipase in the absence of emulsifier and buffer to produce basic oleochemicals.

The enzymatic reaction of Michaelis - Menten type that occured at the interface between oil and aqueous phases was assumed in deriving the rate equations. The effect of water on equilibria has been ignored for hydrolase reactions in an aqueous phase, therefore equations corresponding to a - one substrate, one - order irreversible model are derived and used for analysis. The progress curves predicted from the conversion equations agreed very well with the experimental results under various reaction conditions.

The methodology presented in this work might be used to find kinetic parametes for reactor design and scale-up. Activity of the lipase showed no apparent change between 35 and 40°C, but increased with temperature between 30 and 35°C. When the substrate concentration was higher than 0.3660 g/ml, the equilibrium fractional conversion value of hydrolysis decreased as the concentration of substrate increased. The Michaelis constant gradually decreased with increasing stirring speed between 200 and 400 rpm, and decreased slowly with stirring speed between 400 and 1000 rpm. Equilibrium fractional conversion changed when water was added during the hydrolysis reaction, and reached maximum when water was added after 120 minutes reaction.