CHAPTER I
INTRODUCTION

The use of enzyme as a biocatalyst in industries is become growing rapidly. Lipase is one of the most advantageous because it is stable, inexpensive and widely use in the development of various applications in the detergents, oils and fats, dairy and pharmaceutical industries. Lipases are found in almost all living species, including plant and microorganisms such as rice bran, carica papaya, *Rhizomucor miehei* and *Pseudomas sp.* Lipases have been used to catalyze several commercially important reactions such as esterification (hydrolysis), transesterification and interesterification.

In esterification reactions where the substrates are poorly soluble in water and water is a product, the reaction yields in aqueous system are generally low. The presence of water affects the equilibrium position of the reaction as well as the distribution of the product in media. Water can also limit the solubility of hydrophobic substrates around the enzymes. In addition, water affects the thermodynamic stability of enzymes. However, lipases need a small amount of water to retain their activity. To achieve the water content problem, several approaches have been studied such as enzyme immobilization and reverse micelles.

Reverse micelles are dispersion of water in oil, which small drop of water is stabilized by surfactant molecules. Enzyme, such as lipase, can be entrapped in micro-droplet of water while retaining their catalytic ability. Moreover, large interfacial area of oil and water can be provided for lipase to catalyze the reactions.

Therefore, it is not surprising that there are a large number of investigations, which studied the activity, stability, and selectivity of the esterification reactions catalyzed by encapsulated lipase in reverse micelles. However, most of these investigations have focused on the reverse micellar system of sodium bis-(2-ethylhexyl) sulfosuccinate (AOT) in various organic solvents as media for lipase-catalyzed esterification reactions. Thus, further studies on other reverse micellar systems using different surfactant type should lead to more understand about lipase-catalyzed esterification in the reverse micellar system.

In this work, catalytic activity, stability and selectivity of two lipases, *Candida antarctica* lipase B (CALB) and *Thermomyces lanuginosa* lipase (TLL), encapsulated in NaDEHP/isooctane reverse micelle for esterification fatty acids (caprylic acid and oleic acid) and alcohol (hexanol) were studied.