CHAPTER I
INTRODUCTION

There is a growing interest in the use of lipases as biocatalyst in a number of industries. Lipases can be obtained from plant, animal, and microbial sources such as *Rhizomucor miehei, Pseudomas sp*, rice bran and Carica papaya. They have been used to catalyze several commercially important reactions such as esterification, hydrolysis and transesterification. For the thermodynamically-limited lipase-catalyzed esterification, the water content in the reaction media plays an important role. The reaction should be carried out in system with low water content, in which the equilibrium is favored towards synthesis, and hydrolysis is minimized. To achieve this low-water content media, several approaches have been studied such as enzyme immobilization and reverse micelles.

Reverse micelles are fine dispersions of water in organic medium stabilized by surfactant molecules. It has been known that reverse micelles can be used to host enzymes inside water droplets, effectively sheilding them from denaturation resulting from the effect of the organic phase. Furthermore, reverse micellar system can offer high interfacial area and greater solubilities of the substrates, thereby enhancing enzyme activity for reaction.

Therefore, it is not surprising that many investigations have been carried out to study the activity, stability, and selectivity of lipase in lipase-catalyzed esterification reactions using reverse micelle. Most of these investigations have focused on the reverse micellar system of sodium bis(2-ethyhexyl)sulfosuccinate or AOT which is a traditional and well-documented surfactant. In contrast, very few works have studied a similar reverse micellar system of sodium bis(2-ethyhexyl)phosphate (NaDEHP) in this aspect. Moreover, lipase from rice bran which is an abundant by product in Thailand has rarely been studied as biocatalyst for esterification reactions. Thus, this work focuses on the studies of catalytic activity, selectivity and stability of Thai rice bran lipase encapsulated in NaDEHP/iso-octane reverse micelle for esterification of fatty acids and alcohol.