CHAPTER V
CONCLUSIONS

In this study, lipase was successfully extracted from Thai rice bran and was transferred to the organic phase of NaDEHP microemulsions in which it was suitably encapsulated in the reverse micelles. Reverse micellar phase can be viewed as a host for the enzyme as well as the reaction medium for the lipase-catalyzed esterification reactions of fatty acid and alcohol. The activity of lipase extracted from Thai rice bran was found to be highest if properly extracted and stored, preferably at 4^{o}C. The enzyme activity decreased considerably with increasing temperature. The rice bran lipase encapsulated in NaDEHP reverse micelles was shown to have ability to effectively catalyze esterification reactions of two fatty acids, oleic acid and caprylic acid, and hexanol. It was found that the activity of rice bran lipase in catalyzing esterification in NaDEHP reverse micelle strongly depended on the microstructure of reverse micelle such as size (Rh) and water content, (W_o). These factors were controlled by the system parameters, i.e. salt concentration, cosurfactant, and type and concentration of substrates. The optimum W_o for the system of rice bran lipase in NaDEHP reverse micelle which yielded highest reaction rate and conversion was about 8. The results also showed the remarkable selectivity of rice bran lipase encapsulated in NaDEHP reverse micelles with respect to the chain length of the substrate. The enzyme had a preference towards the long chain fatty acid over the short chain fatty acid. This selectivity is expected to be related to the localization of enzyme molecules in reverse micelle microstructure which resulted from the hydrophobic/hydrophilic characters of protein and the availability of the substrates. Moreover, the rate of reaction was found to be also affected by the concentration of the substrates, both fatty acid and alcohol. Lastly, it was recommended to always use freshly extracted rice bran lipase and carefully control the extraction conditions.