



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Alcohol ethoxylate (AE3) was used to form microemulsions with motor oil and n-butanol was used as the cosurfactant and cosolvent for the enhancement of the phase transformation of Winsor Type of microemulsions. For the single nonionic surfactant (AE3) system, the temperature was found to play a significant effect on the microemulsion phase transformation and the $C_{\mu C}$ value which decreased with increasing temperature. The lowest value of $C_{\mu C}$ of 5 wt.% of AE3 was achieved at 40 °C. Moreover, the capacity to solubilize equal amount of oil and water increased with increasing temperature. For the mixed surfactants of methyl ester sulfonate (MES) and AE3 at a weight fraction of MES = 0.02, the $C_{\mu C}$ value increased with increasing NaCl concentration, the higher the amount of NaCl concentration, the larger the solubilization capacity. The addition of MES in the mixed surfactant system resulted in increasing the solubilization of the AE3/MES mixed micells in the studied motor oil medium. From the solubilization parameter (SP) results, the temperature and salinity facilitated the solubilization of oil, leading to the formation of middle (Winsor Type III) microemulsion phase. In addition, both temperature and salinity had a remarkable effect on the equilibrium IFT behavior. The lowest IFT increased with the increase in temperature and located in middle microemulsion phase region. For salinity effect, the lowest IFT shifted to higher total surfactant concentration when NaCl concentration increased. The CMC of AE3/MES mixed surfactant system was found to be 0.01 wt.% which is close to those of both single AE3 and single MES surfactant systems.

5.2 Recommendations

Based on the present results, the following recommendations are suggested for futures studies:

1. Different chain length alcohols may be tried as cosurfactants for the enhancement of microemulsion formation.
2. Microemulsion formation should be investigated at higher temperature.