

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

This work aimed to demonstrate microemulsion approach for detergency application by using dowfax surfactant (alkyl diphenyl oxide disulfonate) as one of the component in the formulation because of its excellent hardness tolerance. However, since dowfax is a hydrophilic surfactant which, hardly form microemulsion with any hydrophobic oil, thus other surfactants are necessary to be introduced to make a proper balance of hydrophobicity and hydrophilicity to form microemulsion. Linker concept was also employed in this study for selection of surfactants. Motor oil, hexadecane and triolien were selected as oily soils for both experiments of phase behavior and detergency

For hexadecane and motor oil, a mixed surfactant of 3% AOT, 2% ADPODS and 2% Span 80 was selected for the phase study and detergency experiment. Salinity was varied to obtain a Winsor's type III microemulsion. The supersolubilization (SPS) and the middle phase regions were identified from the ultralow values of dynamic IFT. It was found that for our formulation, the oil removal or the detergency efficiency of both oils increased remarkably at the regions of the SPS and the middle phase as a result of low IFT values. Moreover, the studied formulation was also found to be superior to the commercial liquid detergent product in removing both oils. For the detergency results, when the system was operated at the regions of SPS and the middle phase, the oil removal in the rinse step was found to be as high as that in the wash step. Firstly, the oil detachment is resulted from an increase in the contact angle since the IFT of the system is reduced by the presence of surfactant. Once the system reaches equilibrium, the IFT value becomes very low or ultralow (10^{-1} - 10^{-3} mN/m) leading to the spreading of the oil on the fabric. The remaining oil on the fabric is simply removed in the rinse step since the IFT value of the system increases resulting in the reduction of the spreading effect and increasing the contact angle leading to oil discontinuity and be detached by the help of agitation.

For the system with triolien, three formulations containing AMA, ADPODS and Tergital15-S-5 were selected for the phase study and detergency experiment. Three studied formulations having different concentration of ADPODS could form

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