CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Both single (Alfoterra) and mixed surfactants (Alfoterra and SDS) were employed to obtain the ultralow interfacial tension of Winsor Type III microemulsions with diesel by varying surfactant concentration, salinity, and oil to water ratio. The formations of both single and mixed surfactants to obtain the ultralow IFT were selected for running the froth flotation experiments. In froth flotation operation, using the single surfactant systems, the separation did not occur because the system had a very low foam stability and the foam produced could not reach the outlet at the top of the flotation column. For the froth flotation experiments with the mixed surfactants, SDS was added to enhance the foam stability of the system in order to obtain the separation. The effects of operating variables such as air flow rate, HRT, and foam height were investigated systematically. The system with 0.1 wt% Alfoterra, 0.5 wt% SDS, 4 wt% NaCl, oil:water ratio 1:19 at air flow rate 0.30 L/min, foam height 26 cm, and HRT 49 min gave a high oil removal up to 90.37 %. Not only the ultralow IFT but also foamability and foam stability are significant for high oil removal in the froth flotation operation. The system using a very high NaCl concentration provided the reduction of IFT but cannot enhance the efficiency of froth flotation due to the low foam stability. The IFT values of different oil to water ratios are in the same order of magnitude and the effect of oil:water ratio is insignificant on the froth flotation performance. An air flow rate exceeding the optimum point can deteriorate the oil removal efficiency. An increase in HRT increases the oil removal. With increasing foam height in the studied range, the oil removal decreases slightly.

5.2 Recommendations

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

1. To investigate the removal efficiency of diesel oil from wastewater by using froth flotation applied with gas aphrons.
2. To study a more hydrophobic oil such as motor oil and cooking oil in both microemulsion formation and froth flotation experiments.