CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Both single (SDS) mixed surfactants (Alfoterra and AOT) were employed to obtain the ultra low interfacial tension of Winsor Type III microemulsion with cutting oil 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 mixed 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 single surfactants, SDS was selected 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% SDS, 5 wt% NaCl, oil content 500 ppm at air flow rate 0.30 L/min, foam height 30 cm, and HRT 60 min gave a high oil removal up to 95.98 %. Not only the ultra low 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. An air flow rate exceeding the optimum point can deteriorate the oil removal efficiency. An increase in HRT increases the oil removal. As 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 cutting oil from wastewater by using continuous froth flotation applied to the real system.

2. To study more hydrophobic oil such as motor oil and cooking oil in both microemulsion formation and froth flotation experiments.