CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In the present study, Alfoterra 145-3PO was used to form microemulsions with cutting oil at various surfactant concentrations, salinity, and oil-to-water ratios. The increase in salinity enhanced the phase transformation of Winsor Type of microemulsions. The microemulsion phase diagram (fish diagram) was constructed in order to know the conditions which Winsor Type III microemulsion exists and the CμC was found to be 0.3 wt.% Alfoterra 145-3PO at 13 wt.% NaCl, and an oil-to-water ratio of 1:1. Three systems that provided different types of microemulsions were selected for running the froth flotation experiments. In the froth flotation experiments, the results showed that the cutting oil removal in the Winsor Type III microemulsion condition was higher than those in the Winsor Type I and Winsor Type II microemulsion regions. Foam stability and foamability were found to be the crucial factors affecting the separation performance of froth flotation. An increase in HRT increased the oil removal. The system with 0.3 wt.% Alfoterra, 10 wt.% NaCl, 500 ppm oil content at 0.30 L/min air flow rate, 31 cm foam height, and 20 min HRT gave the highest oil removal of 83%. The values of both the equilibrium IFT and the dynamic IFT at 20 min, which is hydraulic retention time for the froth flotation experiments, are in the same order of magnitude. Hence, it is insignificant on the froth flotation performance. This work shows that quantitative removal of cutting oil can be achieved by continuous froth flotation and the maximum oil removal was found in the Winsor type III region. And the surfactant in the system can greatly reduce the coalescence rate of the air bubbles and stabilize the air bubbles in the froth flotation column.

5.2 Recommendations

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

1. To study the effect of air flow rate on the froth flotation experiment.
2. To study the effect of packing media in a froth flotation column.