

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

In this multistage operation, the performance of the fractionator was increased substantially with increasing number of stages up to 3 stages but a fourth stage improved performance only marginally. An increase in the air flow over the range studied decreases the enrichment ratio and decreases fractional remove of surfactant. A greater foam height produces a higher enrichment ratio and higher fractional remove of surfactant. The enrichment ratio decreases while the surfactant removal increases as feed concentration increases. A multistage unit is superior to a single-stage foam fractionator, in terms of a higher enrichment ratio and shorter residence time.

By studies the operational parameters on three types of surfactants – SDS, CPC, and Span80, the specific air velocity, foam height and number of stages in operation of a multistage fractionation column affect the removal degree and the enrichment ratio, CPC is removed more favorably than the other two types of surfactants because of the characteristic of its foamability and foam stability. The multistage foam fractionation model are the most suitable for selected cationic surfactant in case of the efficiency of surfactant separation. As compared among three surfactants system, there were the same trend but CPC gives the highest enrichment ratio. CPC has lower CMC than that of SDS, means CPC has lower adsorption density per unit area and lower repulsive force leads to weakness repulsive force therefore lower foam ability and foam stability, less stable and less persistent foam this can interpret that CPC molecules easier to coming out with foam than SDS leads to higher separation and enrichment ratio. According to CPC has lowest foam forming in foam stability than SDS and Polyoxyethylene monolaurate due to the competition between gravity forces and external pressure in channels separating adjacent bubbles a lot better than SDS and Polyoxyethylene monolaurate. The resistance to the gravitational drainage has adequate time effects imply that the top of the foam becomes dryer than that of SDS and Polyoxyethylene monolaurate this leads to highest in enrichment ratio in CPC.

The effect of the coefficient of variation on the enrichment factor or foam fractionation efficiency is found to be more pronounced at lower superficial gas velocities, higher foam height, higher feed flow rate, lower surfactant inlet concentration and higher the number of stage on three surfactant types.

As the limited of the multistage column design, the recommendation on the physical properties for further studies are tray spacing adjusting, position of feed inlet and reflux of foamate. Since this study imitate wastewater which focus on three types of surfactants but solely operated therefore should focus on several types of surfactants in the system.