



CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The research was conducted to estimate the overall oxygen transfer coefficients (K_{La}) in the presence of surfactants using the turbine aeration system. The effects of surfactant concentrations, turbulent condition and power input on K_{La} values were investigated. All conclusions were:

1. The experimental results showed the K_{La} value was reduced in the presence of surfactants with a larger percent decrease in K_{La} occurring at a higher surfactant concentration.
2. Proposed equations could be used for estimating the K_{La} value, when surfactant was presented in case of geometrical similarity and same condition.
3. In turbulent condition, K_{La} value increased with higher turbulent. However, K_{La} values decreased, when surfactant concentration was higher than 10 mg/L.
4. Experimental evidence effect of surfactants, turbulent condition and power input were found in this study.
5. This study verified the phenomena occurred in actual wastewater treatment plant in the careful laboratory scale setup.

5.2 Recommendations

Although oxygen transfer coefficient (K_{La}) was estimated in this study, more studies should be done for further information. Some recommendations would be expressed as:

1. Determining the oxygen transfer of turbine aeration system using the actual industrial wastewater should be studied.
2. New guideline of oxygen transfer tests should be excluded to simulate wastewater conditions by addition of surfactants into clean water.
3. In the hazardous waste aspects, the relationship between the presence of used oil in the industrial wastewater and the overall oxygen transfer coefficient (K_{La}) should be investigated. Also the effect of surfactant concentrations and used oil concentration on oxygen transfer need to be determined in the future.
4. The comparison of the cost-effectiveness of the turbine aeration system with other aeration systems (such as high-speed surface aeration, diffused-air system, high-purity oxygen system) should be carried out.

5.3 Engineering significance

An important concept in the design of aeration process is the relationship between the performance of the device under test condition and its performance in the plant. In this study, the K_{La} value, which was used for the design of the aeration system was chosen to optimize. In the engineering aspects, suggestion for operation design should concern more about the quantity of actual surfactant concentration. Suitable value of overall oxygen transfer coefficient (K_{La}) in design would decrease the cost of energy consumption when operating the system. Designing biological wastewater treatment plant also requires knowledge of certain operational criteria like the amount and type of surfactant present in the wastewater.