CHAPTER VII

CONCLUSIONS

At the beginning of the research work, the treatment of diluted raw wastewater was firstly studied at a period of 69 days. During this period, the process efficiency was normally more than 85%, under the nutrient controlled condition. However, the problem of sludge bulking due to filamentous bacteria was encountered in this period.

After that the partial degradable of tapioca wastewater from waste stabilization ponds was used as feeding substrate to the laboratory scale contact stabilization unit through out the study for a period of 331 days. Based on these results, the conclusions can be summarized as following:

1. The contact stabilization process has ability to treat the partial degradable of tapioca wastewater with maximum process efficiency of 97% at sludge age 20 days.

2. The main parameter which controls the operation and the design procedure of the contact stabilization process is sludge age (θ_c).

3. Although, the COD:N:P ratio is more than 150:5:1 as well as the process is operating at high sludge age values of 10 and 20 days the problem of sludge bulking due to filamentous bacteria is encountered through out these periods.

4. The trace elements, $MgSO_4.7H_2O$, $CaCl_2$, $FeCl_3.6H_2O$ and KH_2PO_4

in solution are affected to restrict the population of filamentous bacteria which it could be get rid of sludge bulking problem.

5. The recommended sludge age value ranges from 5-20 days under the nutrient and trace element controlled condition. It should be equivalent to the specific substrate utilization rate which ranges from 0.2-0.8 kg COD/kg-MLVSS-days.

6. The SVI value of the process decreases exponentially as the sludge age increases.

7. The process efficiency slightly decreases directly as the contact time decreases.

8. The process still has capability for wastewater treatment with the efficiency of 62% at sludge age 10 days when the contact time approached zero.

9. The VSS/SS ratio decreases directly as the sludge age increases. The average value is found to be 0.8.

10. The kinetic coefficients of partial degradable of tapioca wastewater are as following: the growth yield coefficient (a) is equal to 0.327 g VSS/g COD, the microorganism decay coefficient (k_2) is equal to 0.041 day^{-1} and the other esential kinetic coefficients such as; a_1^*, a_2^*, a_1, a_2, a_3, a_4, $(K_o)_{TT}$, $(K_o)_{CT}$, γ_{TT} and γ_{CT} are evaluated.

11. The mathematical models and design procedure of contact stabilization process has been proposed and recommended.

RECOMMENDED FOR FUTURE STUDY

1. A optimum dose of trace elements, which has ability to restrict the population of filamentous bacteria should be considered,
2. A comparative study whether colloidal and soluble wastewater is affected to the kinetic coefficients or not,
3. A comparative study of the oxygen uptake-rate between the contact stabilization process and conventional activated sludge,
4. A feasibility study of anaerobic contact stabilization process should also be investigated.