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| Thesis Title    | Efficiency of Combined Fixed Film and Activated Sludge System for Treating Domestic Wastewater |
| Thesis Credits  | 12   |
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| Degree of Study | Master of Engineering  |
| Department      | Environmental Technology   |
| Academic Year   | 2001   |

#### Abstract

The research was concerned on the efficiency of combined fixed film and activated sludge system for treating domestic wastewater. The system was designed on the basis of improving the removal efficiency of activated sludge system by adding fiber plate in the aeration tank of activated sludge system. The experiments were carried out by using raw domestic wastewater and synthetic domestic wastewater, contained COD, BOD, TKN and phosphorus at concentration of 350, 250, 40 and 6 mg/l, respectively.

The results showed that the oxygen transfer rate in the aeration tank with and without fiber plate were 2.44% and 1.79%, 2.30% and 1.28% and 2.48% and 1.99% at the level of 30, 60 and 90 cm from the bottom of aeration tank. Experimental results under various continuously organic loading of 0.4, 0.5, 0.65, 0.8 and 1.0 kgBOD/m<sup>3</sup>-d, showed that the COD, BOD, TKN and phosphorus removal efficiencies with lowest organic loading of 0.4 kgBOD/m<sup>3</sup>-d and highest organic loading of 1.0 kgBOD/m<sup>3</sup>-d were 89.58% and 71.45%, 91.74% and 81.20%, 73.91% and 10.48% and 23.49% and 1.34%, respectively. But, the COD, BOD, TKN and phosphorus removal efficiencies under batch type system with organic loading of 0.5 and 1.0 kgBOD/m<sup>3</sup>-d were 86.93% and 84.34%, 92.05% and 88.02%, 30.69% and 15.82% and 28.71% and 18.39%, respectively. The dissolved oxygen in the aeration tank was decreased with the increasing of organic loading. However, the dissolved oxygen under the highest organic loading of 1.0 kgBOD/m<sup>3</sup>-d was higher than 1.0 mg/l. Effluent SS was also increased with increasing of organic loading. However, the effluent SS was lower than 30 mg/l when the organic loading of

system was as high as  $1.0 \text{ kgBOD/m}^3\text{-d}$ . In addition, the pHs of wastewater in aeration tank and the effluent were in range between 6 and 8.

The COD, BOD, TKN, phosphorus and SS removal efficiencies with raw domestic wastewater under batch type operation of 1.0 and  $2.0 \text{ m}^3/\text{d}$  (or  $0.26 \text{ kgBOD/m}^3\text{-d}$  and  $0.52 \text{ kgBOD/m}^3\text{-d}$ ) were 76.84% and 64.14%, 80.53% and 75.68%, 68.39% and 39.96%, 11.29% and 11.53% and 80.16% and 75.65%, respectively. And the dissolved oxygen and pH in aeration tank and effluent were in range of 2.0-3.5 mg/l and 7.3-7.5 and 1.0-3.0 mg/l and 7.4-7.6, respectively.

From the experimental results above, the designed system could be used to treating domestic wastewater with high efficiency. The qualities of effluent met the standard permission of Ministry of Science, Technology and Environment.

Keywords : Biological treatment system / Activated sludge system / Fixed film system /

Domestic wastewater