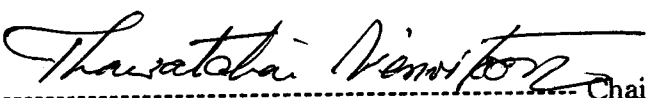THESIS TITLE : DOMESTIC WASTEWATER TREATMENT OF AERATED

SUBMERGED BIOLOGICAL FILTER PROCESS

AUTHOR : MR.RAKSIN SIRIPUTON

THESIS ADVISORY COMMITTEE :

----------------------------------------------------- Chairman

( Associate Professor Thawatchai Nienvitoon )

----------------------------------------------------- Member

(Associate Professor Suparerk Sinsupan)

----------------------------------------------------- Member

(Asistant Professor Jaruwan Chokanapitak)

## ABSTRACT

This experimental research had an objective to study the efficiency of

domestic wastewater treatment through the aerated submerged biological filter

process by using cross-flow media, different hydraulic retention time, organic

loading and hydraulic loading to investigate proper aeration, biochemical reaction in

a reactor from Khon Kaen University residences. The treatment system consisted of

two parts : a areactor with cross-flow media with aeration system in the reactor and

a sedimentation tank. The experiment had 3 tanks with HRT in the reactor of 3, 5, 7

hours respectively. The wastewater feeding to each tank was in 4 sets : 1,500, 2,000,

2,500 and 3,000 liters/day, respectively.

The result revealed that the third tank with 7 hours (HRT) had the best efficiency in COD and SS removal with an average percentage of 91.91 and 88.79, respectively, while the first and the second with 3 and 5 hours (HRT) had the efficiency in COD, and SS removal, an average percentage of 85.40, 72.21, 89.77 and 81.08, respectively. When an amount of 1,500 liters of wastewater /day entered the process, COD and SS reduction of the first tank was different from the second and the third tank with statistically significant (P-value < 0.01). When the 4 sets of experiment were compared, the efficiency in COD and SS removal was tended to decrease obviously when waste water was fed into the tanks with 1,500, 2,000, 2,500 and 3,000 liters/day, respectively.

With regression analysis to assess the relationship between organic removal rate, $gCOD/m^2.d$ and organic loading , $gCOD/m^2.d$, the 3 tanks were found with a positive linear relation, the correlation coefficient in the first, the second and the third tanks was 0.6474, 0.7528 and 0.8153, respectively, hence the third with the highest correlation, in accordance with the result of the Monod's study. The third tank was found with a better biochemical reaction than the first and the second with $q_{max}$, $k_s$ and $R^2$ of 142.86, 121.43, 76.80%, respectively, and standard error of prediction was 2.78.

This experiment was concluded that the tank using 7 hours (HRT) with the flow rate of 1,500 liters/day gave the best efficiency of treatment. Also, the linear regression base on Monod's equation, of the tank with 7 hours (HRT) was more reliable on investigation than the tanks with 5 and 3 hours (HRT).