NARADHIP KIJJADHIP : MODELLING OF ANAEROBIC CONTACT STABILIZATION PROCESS. THESIS ADVISOR : ASSC. PROF. SURAPON SAIPHANICH, Ph.D. 89 PP. ISBN 974-581-620-5

This research aims at investigating the possibility to treat the wastewater with low strength soluble organic substances by the anaerobic contact stabilization method. In addition, the production rates of methane gas and biogas including some biological coefficients of the process were determined. In the experiment, sugar was used to prepare the synthetic wastewater at COD concentration of about 500 mg/l. The wastewater flow rate was 60 l/d resulting in 2-h detention period in the contact tank and 20-h in the stabilization tank. The sludge recycle rate as compared to inflow rate was 100%. The experiment was divided into 4 sets by varying sludge ages from 150, 100, 75 to 50 days respectively. The total experiment period is 180 days.

It was found from 4 sets of the experiment that the COD removal efficiency is approximately 80% with the production of biogas from the contact tank and the stabilization tank at average rates of 1.42-1.62 l/d and 2.56-3.24 l/d, respectively. The biogas contains about 60% by volume of methane gas. In the other hand, methane gas was generated from the contact tank and the stabilization tank at rates of 0.072-0.081 l/g COD removed and 0.88-0.98 l/g COD removed, respectively. However, COD removal efficiency is considered rather high since only 1-day retention period is required as compared to the conventional anaerobic treatment process. However, the COD removal efficiency cannot be increased to that of the aerobic process due to nature of bacteria. The biological coefficients as found from the study are the growth rate coefficient (Y) of 0.225 gm MLSS/ gm COD bacterial decay rate (k_d) of 0.0116 d^{-1}, maximum rate of substrate utilization $(K_o)_T$ of 2 d^{-1} and constant (r_T) of 2.32 d^{-1}.

It was found from 4 sets of experiment that the anaerobic contact stabilization process can treat the low content wastewater so that the system is smaller than other general anaerobic processes. In this process, bacteria in the contact tank absorb the organic substances for further biodegrading in the stabilization tank. The major problem of the process is to control the sludge age therefore the discharge and recycling of sludge is important. In addition, power must be supplied to the reactor to facilitate complete mix of wastewater and suspended bacteria.