



## Various operating conditions affecting the performance of aerobic digestion coupled with membrane filtration

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### ABSTRACT

An aerobic digestion coupled with membrane filtration (ADMF) system was investigated to determine the influence of various operating conditions to the efficiency of sludge thickening. Three different parameters were studied: the effect of hydraulic retention time (HRT), aeration and addition of coagulant. The effect of varying HRT was noticeable with the decrease in viscosity with increasing HRT. Transmembrane pressure, which indicates the extent of membrane fouling, increased with the decrease in HRT. Effect of aeration on the rate of increase in mixed liquor suspended solid concentration was observed to be insignificant, indicating that the aeration rate affected the filtration performance rather than the sludge reduction efficiency. Study on the effect of coagulant was evaluated by comparing two kinds of coagulants, organic and inorganic, at different concentrations. Dead-end filtration experiment and determination of critical flux were conducted to investigate the permeate performance according to coagulant addition. Higher value of critical flux was obtained with the addition of inorganic coagulant, while the total resistance was decreased with increasing coagulant concentration. Results show that while the addition of inorganic coagulant enhanced the ADMF system by improving membrane permeability, it is recommended that the system be operated at high HRT and aeration rate.

*Keywords:* Aeration; Aerobic digestion; Coagulation; Hydraulic retention time; Membrane filtration; Sludge thickening

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