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Treatment of Cake Shop Wastewater by Pilot-Scale Submerged Membrane Bioreactor (SMBR)

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Abstract

In this work, the treatment of cake shop wastewater using Submerged Membrane Bioreactor (SMBR) on pilot-scale has been studied. The commercial hollow fiber membrane was used with a total surface area of 0.609 m^2. The experiment was set up with three different conditions as follows: model 1 - the SMBR system used suspended activated sludge; model 2 – the SMBR system was combined with the substrate inside; model 3 – the SMBR system was added with PAC (Poly Aluminium Chloride) excluding subtrate. Effects of organic loading rates (OLR) were investigated to assess the performance of each model. The results showed that the optimal OLR of model 1 achieved at 11 kgCOD/m^3.day and COD, TN, TP removal efficiencies were 97.93%, 71.04% and 79.04%, respectively. The optimal OLR of model 2 was 13.3 kgCOD/m^3.day and the COD, TN, TP removal efficiencies were 98.04%, 82.35% and 84.59%, respectively. 11 kgCOD/m^3.day was optimal OLR for model 3 with COD, TN, TP removal efficiencies 98.10%, 73.35% and 84.70%, respectively. Trans-membrane pressure (TMP) of the whole operation was in range of 20 to 55.5 CmHg and flux values were observed in the range of 35.86 to 333.24 l/m^2.h. Depending on discharge requirements, an opproximate processing model for cake shop wastewater treatment is choosen.

***Key words*:** Cake shop wastewater, SMBR, Activated sludge, PAC.