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New technology for wastewater treatment to decrease fouling propensity

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ABSTRACT

Membrane bioreactor (MBR) is widely regarded as an effective tool for wastewater treatment to the conventional activated sludge process thanks to its various advantages. In this paper, we study the influence of chemical oxygen demand to nitrogen ratio (ratio COD/N) on MBR fouling propensity. Therefore, two runs (I and II) were conducted with different low ratio COD/N equal to 2.3 and 0 to promote autotrophic bacteria development. The organic loading rates (OLR) were equal to 0.3 and 0kg $COD.m^3d^{-1}$ for runs I and II, respectively and the nitrogen loading rate (NLR) was equal to 0.12 and 0.2kgNm^3d^{-1} for both runs. The results showed that the fouling rate decreased from 0.064E+12 to 0.015E+12 ($m^{-1}d^{-1}$) with the decrease of COD/N ratio. The two runs are conducted without membrane cleaning during all the experimental periods equal to 51 for the first run and 54 days for the second. The results also point out that the fouling resistance was mainly reversible for both runs such as the contribution of the resistance due to suspended solids (Rg) to the total resistance was equal to 60 and 74% for run I and II, respectively. Moreover, the contribution of adsorption resistance (Rads), decreased from 12.7 to 7.19 %. This leads to a great reduction in the cost of membrane chemical cleaning.

Keywords: MBR; Fouling; Membrane; Resistance; COD/N ratio

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