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Submerged microfiltration coupled with physcio-chemical processes as pretreatment to seawater desalination

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ABSTRACT

In this study, the critical flux of the submerged membrane system was experimentally evaluated when it was used for seawater with and without pre-treatment. In this study, different processes such as flocculation with ferric chloride ($FeCl_3$) and different doses of PAC adsorption were used as a pre-treatment. The pretreatment of flocculant of 2 mg/L of $FeCl_3$ and adsorption with the dose of 1 g/L PAC showed an improvement in the critical flux from 5 L/m^2.h to 6.7 L/m^2.h and 13.3 L/m^2.h respectively. The performance of these pretreatments was also determined in terms of modified fouling index using ultrafilter membrane (UF-MFI). UF-MFI and SDI indicated that PAC adsorption was a better pretreatment than flocculation for the seawater used in this study. Molecular weight distribution (MWD) of seawater organic matter was also examined after different pretreatments. MWD of the raw seawater was mainly in the range from 1510 to 130 Da. It is observed that $FeCl_3$ flocculation and PAC adsorption as pretreatments partially removed the organic matter of 1510 Da and 130 Da respectively.

Keywords: Critical flux; Adsorption; Preflocculation; Pretreatment; Seawater

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