

Large-pore membrane filtration with coagulation as an MF/UF pretreatment process

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ABSTRACT

MF/UF provides an effective means for removing particles and microorganisms from a feed stream via a sieving mechanism. A major obstacle to further incorporation of the membrane processes in water treatment plants, however, is the transmembrane pressure increase caused by the contaminants or pollutants in the surface water in spite of the use of coagulation and sedimentation as pretreatment processes. Therefore, a more effective process, such as prefiltration, should be considered for the pretreatment of drinking water to enhance the membrane process. In this study, a large-pore membrane filtration system with coagulation was used and evaluated as a pretreatment process for drinking water treatment. The pore diameter of the large-pore membrane reaches 2.0 μm , thus allowing for high-flux filtration under low pressure, and removing the particles effectively. According to the results of the present study, the large-pore membrane filtration system with coagulation can be used as an effective pretreatment process for drinking water because of its high turbidity and algae removal efficiency. Three different fouling models were used in this study to analyze the filtration characteristics: the pore constriction, pore breakage, and cake formation models. The major fouling mechanisms were determined to be cake formation in winter and pore breakage in spring.

Keywords: Large-pore membrane; Pretreatment; Model

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