

Hybrid photocatalysis/submerged microfiltration membrane system for drinking water treatment

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ABSTRACT

In this study, the potential of UV/TiO₂ photocatalytic oxidation method to control of membrane fouling caused by natural organic matter (NOM) was investigated under various conditions in submerged MF membrane system. Effect of TiO₂ concentration, UV irradiation in the absence of TiO₂, TiO₂ in the absence of UV irradiation and combination of UV/TiO₂ photocatalytic oxidation were investigated. Additionally, intermittent and continuous UV application and initial NOM concentration on the pressure increase and rejections were also studied. The results of synthetic and raw water experiments were compared. It was found that TiO₂ concentration is very important parameter by means of permeate pressure increase and removal efficiencies. UV irradiation in the absence of TiO₂ or TiO₂ in the absence of UV irradiation was not effective and combination of UV/TiO₂ photocatalytic oxidation gave better results. Also, intermittent UV application was not as effective as UV/TiO₂. The increase in NOM concentration also increased the pressure increase. Synthetic and raw water experiments were compared and raw water experiments gave higher pressure increase and lower removal efficiencies.

Keywords: Submerged membrane system; UV/TiO₂ photocatalytic oxidation; Microfiltration; NOM removal; Adsorption

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