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Effect of chemical preoxidation coupled with in-line coagulation as a pretreatment to ultrafiltration for algae fouling control

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ABSTRACT

Algae fouling can cause a transmembrane pressure (TMP) increase or flux decrease during ultrafiltration of surface waters. In this study, chemical preoxidation coupled with in-line coagulation was investigated as a pretreatment step for algae fouling control. The coupled strategy was able to control the fl ux decline. Also, the treated water quality could be improved. Chemical preoxidation by potassium permanganate composites (PPC) and chlorine (Cl_2) removed algae cells by both cell death and adsorption, which could also alleviate the load on the ultrafiltration unit. During the coupled treatment, the electrostatic forces between algae cells and the flocs weaken. The cells could be packed by in situ formed hydrous manganese dioxide and flocs. The flocs would be trapped on the cake layer and the algae fouling for ultrafitlration could be controlled.

Keywords: Chemical preoxidation; In-line coagulation; Ultrafiltration; Algae; Fouling

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