

## Effect of coagulants on the fouling and performance of ultrafiltration (UF) membranes

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### ABSTRACT

The combined coagulation and ultrafiltration (UF) system (C-UF system) is an advanced technology to treat natural organic matter (NOM) present in water. Traditional coagulants — prehydrolyzed inorganic coagulants, organic coagulants and composite coagulants were chosen to treat synthetic water containing humic acid (HA) in order to find an efficient coagulant that could remove NOM from the water effectively. The fouling, removal efficiency of UF and the chlorine decay in the permeate were used to evaluate the effectiveness of the coagulants. The initial UV<sub>254</sub> absorption of the tested water samples were from 0.208 to 0.234, and the UV<sub>254</sub> after coagulation was from 0.05 to 0.184. The UV<sub>254</sub> did not increase after coagulation. Since the humic acid used was soluble, the initial turbidity of the tested water samples were very close to zero. The turbidity increased after coagulation, as the coagulants react with humic acid to form micro-flocs, which cannot be removed fully by sedimentation. The results showed that polyferric chloride could not remove humic acid efficiently during coagulation process, but removed the humic acid well when used in the C-UF system. Moreover, for polyferric chloride and UF system, the concentration of organic compounds in permeates were minimal indicating very low levels of disinfection by-product formation, if chlorinated.

*Keywords:* Coagulant; Membrane; Humic acid; Chlorine decay; Ultrafiltration

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