

## The effects of coagulation with MF/UF membrane filtration in drinking water treatment

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### ABSTRACT

This study proposes coagulation as a pretreatment permitting the optimal operation of drinking water membrane treatment process. Membrane fouling was evaluated for various coagulation control methods and different membrane types [microfiltration (MF)/ultrafiltration (UF)]. A system using MF and UF was operated at a permeate flux of 1.5, 2.0 (m<sup>3</sup>/m<sup>2</sup>)·d. For the direct membrane filtration process without a pretreatment process (Run A), the days of effective operation (Te) under 1.0 kg<sub>f</sub>/cm<sup>2</sup> of trans-membrane pressure (TMP) reached 33 days. It is thought that a pretreatment process was required to remove micro-particles that cause membrane fouling. In the case of coagulation control, according to raw water turbidity (Run B), the Te was 50 days. On the other hand, it could be seen that the membrane filtration system (Run C) that controls the coagulant dose based on the streaming current value (SCV) measurement operated at higher stability (95 days) than previous tests, even under high turbidity (>200 NTU). Pilot plant operation with a UF membrane was more stable than one with an MF membrane. In addition, the TMP in the coagulation/UF process was maintained at a significantly stable level despite the high permeate flux of 2.0 (m<sup>3</sup>/m<sup>2</sup>)·d, when coagulation was controlled by SCV. It can be concluded that the membrane filtration process operated with higher stability when the coagulant dose was properly controlled by SCV.

**Keywords:** Membrane; Ultrafiltration; Microfiltration; Coagulation; Fouling; Streaming current value (SCV)

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