

# **ANTI-FOULING EFFECT OF BENTONITE SUSPENSION IN ULTRAFILTRATION OF OIL/WATER EMULSION**

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## **ABSTRACT**

The effect on membrane fouling resistance during ultrafiltration of oil/water emulsion with the presence of bentonite suspension is experimentally evaluated. The fouling resistance was analyzed as a function of different membrane types and bentonite concentration. The total membrane fouling was categorized into reversible and irreversible, by adopting an appropriate chemical cleaning technique. The results revealed that a 40 % flux augmentation with the increase of bentonite concentration up to an optimum value of 300 mg l<sup>-1</sup> for cellulose acetate membrane. Further increase of bentonite concentration led to particle deposition on the membrane surface and reduced the flux. Whereas the polysulfone membrane did not show the similar flux improvement. This could be due to its high hydrophobicity. The absorption of oil/water emulsion on bentonite increased TOC removal rate from 65% to 80%, and this effect was the major cause of reduction in gel layer formation on the membrane surface. The extent of irreversible fouling of the hydrophilic cellulose acetate membrane was much smaller than that of the polysulfone membrane. These experiments demonstrated that, presence of bentonite could induce transformation of irreversible fouling caused by oil emulsion to reversible fouling, which could be periodically chemically cleaned.

Keywords: Ultrafiltration, oil water emulsion, bentonite, membrane fouling, membrane cleaning

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