



## Comparison of fouling rates for pressurized and submerged ultrafiltration membranes

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### ABSTRACT

Recently, microfiltration (MF) and ultrafiltration (UF) are widely used for water treatment because of their advantages including small footprint, ease of operation, and high removal efficiency of bacteria and pathogenic protozoa. MF and UF membrane modules generally use hollow fibers that can be operated in either pressurized or submerged modes. In this study, we focused on comparison of pressurized and submerged membrane modules in terms of fouling rates. Synthetic feed waters were used for accelerated fouling tests. Lab-scale pressurized and submerged modules were fabricated using same UF fibers. In addition, a special module that allows the application of both positive and negative pressures was prepared. In the three systems (pressurized, submerged, and combined modules), the permeate flux was adjusted to be constant and the increase in transmembrane pressure was continuously monitored. Experimental results showed that the efficiency of the submerged module was better than that of the pressurized module. This may be attributed to the compaction of foulant layer due to the external pressure in the pressurized module. Accordingly, the fouling rate may depend on the ratio of external positive pressure to negative suction pressure in the combined module.

*Keywords:* Microfiltration; Ultrafiltration; Submerged hollow fiber module; Pressurized hollow fiber module; TMP

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