



Linking UF reversible and irreversible fouling to the water quality of surface water and treated municipal wastewater

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ABSTRACT

The interdependencies between water quality parameters and ultrafiltration characteristics (reversible, and irreversible fouling) of surface water (SW) in comparison with treated domestic wastewater (TDW) were systematically investigated. A focus was set to the macromolecular dissolved fraction (“biopolymers”), accounting for about 50% of the full fouling resistance. Correlation matrices were used to point out overall differences of both waters, whereas seasonal monitoring was used to reveal different inter-annual variability. The correlation matrices show that biopolymer concentration significantly correlates with total and reversible fouling of both waters but not with irreversible fouling. The membrane rejection of SW biopolymers showed significant correlations to all parameters (biopolymer concentration, reversibility, etc.). We found significant correlations of temperature with total and reversible fouling (positive in SW but negative in TDW) and irreversible fouling (negative in SW but positive in TDW). Therefore, temperature is suggested as a very handy indicator for total/reversible fouling and especially irreversible fouling. Seasonally, the SW biopolymer concentration shows a clear development (high in summer and low in winter); no comparable trend was observed for TDW. Filtration parameters are clearly subject to seasonal variation. The irreversible amount of SW-induced fouling was maximal in winter and minimal in summer, whereas treated TDW-related variability was lacking such obvious trends.

Keywords: Biopolymers; Ultrafiltration; Irreversible fouling; Surface water; Secondary effluent; Organic fouling; Temperature

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