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Effects of various characteristics of seawater on the performance of dual media filters

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ABSTRACT

In this study, effects of various water quality parameters (TDS, turbidity, DOC) on seawater filtration were evaluated using the laboratory scale dual media filter (DMF). For this purpose, DMF was operated with and without in-line coagulation to filter four different types of artificial seawater. The standard seawater (type 1) was used as a control condition. The type 2 feed was used to examine the effect of TDS, type 3 for the effect of turbidity and type 4 for the effect of organic matter. According to this study, high TDS was beneficial in turbidity removal when DMF filtration was performed without coagulation. High ionic strength reduced the electrical repulsion, helping particle capture by the filter media. In-line coagulation diminished the beneficial effect of TDS. Backwash with wash water alone was found insufficient to clean the media effectively when DMF was filtering highly turbid seawater. Coagulation helped backwash of DMF and restored the turbidity removal performance after backwash when filtering highly turbid seawater. Coagulation also lessened the extent of the solid breakthrough. Coagulation helped the organic removal by DMF, but deteriorated the turbidity removal performance instead.

Keywords: Seawater; Coagulation; Dual media filtration; Backwash; TDS; Turbidity; DOC

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