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Performance of a sand filter in removal of algal bloom for SWRO pre-treatment

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ABSTRACT

The present study has two main purposes: to investigate the performance of a first-stage sand media filter in a case of several reconstituted algal blooms and to better understand fouling mechanism of sand filter due to micro-algae. The retention efficiency of the filter obtained for 30,000, 50,000 and 145,000 cells/ml alga suspensions of *Chlorella vulgaris* is respectively above 90, 90 and 80% only during the first hours of filtration and drop at 74, 78 and 48% after 7 h. The fouling investigation reveals that the number of micro-algae captured in the filter is much higher in the first 30 cm of the bed. The ratio between the volume occupied by micro-algae retained in the filter and the total pore volume does not exceed 0.015% and suggests a minor effect of straining filtration mechanism. The effect of the micro-algae size (*C. vulgaris* (2–8 μm) and *Heterocapsa triquetra* (17–18 μm)) seems not to have a significant impact on the retention efficiency which is encouraging the idea that the adsorption mechanism has a higher affect on the retention than the straining filtration.

Keywords: Sand media filter; Algal bloom; Seawater pre-treatment; Fouling mechanism

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