Performances of a seawater desalination plant made up of a sand filter, ultrafiltration and reverse osmosis membranes during a planktonic bloom.

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The production of salubrious seawater is required for aquaculture and desalination fields even in case of micro-alga blooms. The present work investigates the performances (selectivity and production ability) of filtration plants with respect to dissolved and particulate (toxins, cells, etc) organic pollution coming from micro-algae rich seawater. The granular filtration of *Heterocapsa triquetra* cultures containing 10 000 to 17 000 cells.mL^{-1} is carried out using a bilayer sand filter with bed depth of 1100 mm, in constant flow-rate experiments. The average removal rate of micro-algae cells are 90% and 68% for 5 m.h^{-1} and 10 m.h^{-1} respectively. The turbidity is removed by more than 71% for 5 m.h^{-1} and 57% for 10 m.h^{-1}. By increasing the superficial velocity, the retention probability by diffusion remains negligible, while interception increases from 84.6 to 91.5%, and gravitational contribution decreases from 14.5 to 7.85%. The ultrafiltration (UF) at 100 L.h^{-1}.m^{-2} on PVDF membrane (0.03 µm) of the colloid and soluble parts of suspensions, the particle part would be removed by sand filter pre-treatment, induces high membrane residual fouling (20% of total fouling) and fouling velocity (50.10^{8} m^{-1}.min^{-1}). Nevertheless, the permeate could feed a spiral-wound reverse osmosis membranes. The rejection rates of the total organic carbon, aromatic compounds and carbohydrates are equal to 45%, 48% and 60% respectively. The pristine or fouled UF membrane did not much retained the Paralytic Shellfish Poisoning (PSP) toxins of *Alexandrium minutum* culture contrary to the SW30 reverse osmosis membrane even in case of pronounced ageing.