

Comparing PAC/UF and conventional clarification with PAC for removing microcystins from natural waters

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ABSTRACT

PAC/UF was investigated for removing *M. aeruginosa* cells and microcystins from natural waters and its performance was compared with the conventional clarification with PAC addition (PAC+C/F/S). Ozonated and clarified waters from Tavira's Water Treatment Plant were used. Both processes achieved an absolute removal of chlorophyll-a, but greater turbidity and microcystins (intra and extracellular) removals were reached by PAC/UF. With PAC/UF, 10 mg/L PAC resulted in a cycle-averaged concentration of microcystins in the permeate ($0.72 \mu\text{g/L MC-LR}_{\text{eq}}$) below the WHO guideline value, while the water quality obtained with 15 mg/L PAC+C/F/S was far beyond that guideline value. However, the occurrence of cell lysis during UF (with subsequent release of microcystins and $\text{UV}_{254\text{nm}}$ absorbing substances) and the preferential removal of high molar mass compounds by coagulation yielded better $\text{UV}_{254\text{nm}}$ removals by PAC+C/F/S. Natural organic matter showed a small impact onto microcystins removal, with greater effect of some algogenic compounds, but especially of high concentrations of humic and tannic-like compounds.

Keywords: PAC/UF; Clarification; Microcystins; AOM; NOM

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