



Tannic acid treatment to deter microbial biofouling in flow cell system and on RO membrane in drip flow reactor

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ABSTRACT

Membrane biofouling is a major obstacle, which considerably affects membrane performance and shortens membrane life span. In the present study, the biofouling prevention potential of the tannic acid (TA) was tested on single and mixed species culture under flow conditions in flow cell and on reverse osmosis (RO) membrane in drip flow reactor (DFR). Confocal laser scanning microscopy was used to acquire three dimensional (3D) images of biofilm samples and biofilm biovolume (μm^3) was calculated via IMARIS software. The continuous dosing of TA at 20 mg/L to a flow cell led to a 98.2% ($P < 0.05$) biofilm reduction by PAO1 and 84.6% ($P < 0.05$) by a multispecies culture isolated from an industrial RO membrane. Furthermore, the continuous addition of TA to DFR led to 96.6% ($P < 0.05$) biofilm reduction by PAO1 and 98.9% ($P < 0.05$) by multispecies species, which further indicated the anti-biofouling effect of TA on RO membrane. These results suggest that TA can be a potential agent for the control of RO biofouling.

Keywords: Biofouling; Tannic acid; Biofilm; *Pseudomonas aeruginosa*; RO multispecies

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