



Mitigation of biofouling in forward osmosis process by bacteria-oriented quorum quenching molecules

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ABSTRACT

In this study, the intervention of bacterial communication or quorum quenching (QQ) technique has been investigated to mitigate biofouling in forward osmosis (FO) membrane processes. The 10 mg-C/L lysate of QQ enzyme-producing *Rhodococcus* sp. BH4 successfully degraded 79% of the bacterial signal molecule (*N*-acyl homoserine lactone, AHL). In a continuous lab-scale FO experiment using *Pseudomonas aeruginosa* PAO1 as a model bio-foulant, flux recovery after physical cleaning was higher in the presence of 10 mg/L of *Rhodococcus* lysate. The retardation of biofouling in the presence of *Rhodococcus* lysate was largely due to the reduced amount of bio-volume and extracellular polymeric substances (EPS), which were reduced by 68% and 75% compared with the control. In conclusion, the application of bacteria-oriented QQ molecules could be the potential solution not only to mitigate biofouling but also to meet the economic demands.

Keywords: Biofouling; Quorum sensing; Quorum quenching; *Rhodococcus* sp.; Extracellular polymeric substances

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