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Integrated approach to characterize fouling on a flat sheet membrane gravity driven submerged membrane bioreactor

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Abstract

Fouling in membrane bioreactors (MBR) is acknowledged to be complex and unclear. An integrated characterization methodology was employed in this study to understand the fouling on a gravity-driven submerged MBR (GD-SMBR). It involved the use of different analytical tools, including optical coherence tomography (OCT), liquid chromatography with organic carbon detection (LC-OCD), total organic carbon (TOC), flow cytometer (FCM), adenosine triphosphate analysis (ATP) and scanning electron microscopy (SEM). The three-dimensional (3D) biomass morphology was acquired in a real-time through non-destructive and *in-situ* OCT scanning of 75% of the total membrane surface directly in the tank. Results showed that the biomass layer was homogeneously distributed on the membrane surface. The amount of biomass was selectively linked with final destructive autopsy techniques. The LC-OCD analysis