Mechanism of bisphenol A removal by a submerged membrane bioreactor in the treatment of synthetic municipal sewage: staged analyses

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\textbf{ABSTRACT}

Bisphenol A (BPA) is a typical endocrine disrupting chemical that potentially jeopardizes body health of human beings. A submerged membrane bioreactor (MBR) has been operated at the laboratory scale for the treatment of synthetic municipal sewage containing BPA. For comprehensive investigation about the effect of hollow fiber microfiltration membrane on BPA removal in membrane bioreactor (MBR) system, staged analyses by environmental scanning electron microscope, BPA filtration tests, and membrane cleaning assessments were conducted. The results showed that BPA, chemical oxygen demand, and ammonia-nitrogen (N-NH\textsubscript{3}) were eliminated effectively, at 90.11, 97, and 95\%, respectively. With the running time extension of MBR, cake layer on the membrane surface got thicker, simultaneously on which cell-like substances marking biofilm formation accumulated. Staged BPA filtration tests demonstrated that with the aggravation of membrane fouling, the effect of cake layer on BPA interception was improved. And from staged membrane cleaning assessments it was found that the contents of BPA and its main degradation products including 4-hydroxybenzoic acid (p-HBA), 4-hydroxyacetophenone (p-HAP), and 4-hydroxybenzaldehyde (p-HBAL) in fouled membrane followed the same growth trend. Most of BPA was captured by the activated sludge. And the effect of biodegradation was enhanced over the running time of the MBR unit.

\textbf{Keywords}: Membrane bioreactor; Bisphenol A; Staged analysis; Adsorption; Biodegradation

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