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Endocrine disrupter compounds removal in wastewater using microalgae: Degradation kinetics assessment

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Abstract

This paper describes a study carried out to determine the removal kinetics of four micropollutants (4-tert-octylphenol (OP), technical-nonylphenol (t-NP), 4-nonylphenol (4-NP) and bisphenol-A (BPA)) usually found in wastewater streams. The kinetic experiments were carried out in batch reactors containing the effluent of an Anaerobic Membrane BioReactor (AnMBR) in the presence of light, oxygen and microalgae. As the degradation process of the studied micropollutants obeyed a pseudo-first-order kinetics, the second-order kinetics for each micropollutant was then calculated. The second order rate constants for the hydroxyl radical (k_{OH}) ranged from $7.0 \cdot 10^{+10}$ to $6.6 \cdot 10^{+12}$ L·mol⁻¹·min⁻¹ and for the oxygen (k_{O_2}) from 77 to 125 L·mol⁻¹·min⁻¹. The k_{O_2} values were significantly lower than the k_{OH} values, indicating that the hydroxyl radical is a better oxidising agent than oxygen. However, as the concentration of dissolved oxygen was higher than that of the hydroxyl radical, higher oxygen pseudo-first order

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