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Removal of atorvastatin in water mediated by CuFe_2O_4 activated peroxymonosulfate

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Abstract

Atorvastatin (ATV) has been widely detected in wastewater treatment plant and aquatic environment. Limited mineralization ratio of ATV in current wastewater treatment processes may result in the accumulation of its transformation intermediates in effluent and cause additional ecological risk to the environment. In this study effectiveness of peroxymonosulfate (PMS) activated by CuFe_2O_4 on the degradation of ATV in water were examined. Complete removal of ATV was achieved by using 40 ppm CuFe_2O_4 and $25 \mu\text{mol dm}^{-3}$ PMS. Eight intermediates were identified and four degradation pathways were proposed. The distribution of major intermediates ATV lactone (P_{541}), hydroxylated ATV lactone (P_{557}) and the pyrrole ring-open intermediate (P_{416}) were monitored with different PMS dosages. As PMS concentration increased from 25 to $150 \mu\text{mol dm}^{-3}$, the main intermediates accumulated were evolved from P_{541} and P_{557} to P_{557} and P_{416} , and all intermediates were completely degraded with $750 \mu\text{mol dm}^{-3}$ PMS. 61.72% TOC removal was achieved at pH 7.0 with 100 ppm CuFe_2O_4 and 3 mmol dm^{-3} PMS, which indicated that ATV

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