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Degradation of metoprolol through bio-electro-Fenton in a bioelectrochemical system (BES)

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The emergence of some trace pollutants which are usually refractory, endocrine disrupting has drawn much attention nowadays and advanced oxidation processes (AOPs) are popularly employed to degrade them. The removal of metoprolol (MTPL), one of the most commonly used β-blockers, was investigated in a lab-scale microbial electrolysis cell-Fenton system. The effects on the removal efficiency of several key parameters including applied voltage, pH and catalyst dosage were examined. 65.74\% and 54.59\% of metoprolol was removed in 12 hours in synthetic and real wastewater, respectively, at the optimal investigated parameters when the initial compound concentration was 500 \(\mu\)g/L. Over 90\% of MTPL can be removed in 2 hours both with synthetic and real wastewater when the initial compound concentration was decreased to 10 \(\mu\)g/L which is close to the concentration in real aquatic system. Afterwards, the removal of metoprolol at continuous flow mode was further studied at different hydraulic retention time (HRT) 2 h, 4 h and 6 h. About 77\%, 92\% and 95\% of the removal was obtained, respectively.

Fig. 1 The removal of MTPL in the BES system at batch mode. (Operation conditions: 0.2 V, pH 3, 0.2 mM Fe\textsuperscript{2+})

Keywords: metoprolol, microbial electrolysis cell, Fenton process

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