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Synthetic hospital wastewater treatment by coupling submerged membrane bioreactor and electrochemical advanced oxidation process: kinetic study and toxicity assessment.

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Abstract: In this work, the combination of membrane bioreactor (MBR) and electro-oxidation (EO) process was studied for the treatment of a synthetic hospital wastewater fortified with four pharmaceutical pollutants namely carbamazepine (CBZ), ibuprofen (IBU), estradiol (E-E) at a concentration of 10 µg L^{-1} venlafaxine (VEN) at 0.2 µg L^{-1}. Two treatment configurations were studied: EO process as pre-treatment and post-treatment. Wastewater treatment with MBR alone shows high removal percentages of IBU and E-E (~ 90%). Unlikely for CBZ and VEN, a low elimination percentage (~ 10%) was observed. The hydraulic and the solid retention times (HRT and SRT) were 18 hours and 140 d respectively, while the biomass concentration in the MBR was 16.5 g L^{-1}. To enhance pharmaceuticals elimination, an EO pretreatment was conducted during 40 min at 2 A. This configuration allowed a 92% removal for VEN, which was far greater than both treatments alone, with lower than 30% and 50% for MBR and EO, respectively. The MBR-EO