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Continuous flow pulse corona discharge reactor for the tertiary treatment of drinking water: Insights on disinfection and emerging contaminants removal

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Abstract

The widespread occurrence of emerging contaminants (ECs) and pathogens in potable water sources has led to the need of an efficient alternative method for water treatment. Three pharmaceuticals and two pesticides were selected for the ECs degradation study in a continuous flow pulse corona discharge reactor. For a power dissipation of 58.67 W, ECs were completely removed from lake water with a flow rate of 10 mL/min. Whereas, 91 to 100% ECs degradation was achieved in river water after a hydraulic retention time (HRT) of 24 min. Initial bacterial concentrations were determined in lake and river water samples and subsequently, disinfection studies were carried out. With the same power input, complete disinfection (3 log reduction in river water) was achieved within HRT of 10 min. The toxicities of the ECs were completely eliminated after the plasma treatment. Several other water quality parameters were also monitored and an increase in nitrate concentration and decrease in pH value was observed after

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