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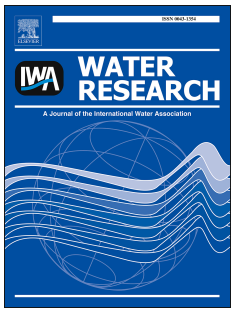

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Stormwater disinfection using electrochemical oxidation: A feasibility investigation

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ABSTRACT

Electrochemical oxidation (ECO) has shown good potential for disinfection of wastewater discharges but has not been tested for stormwater. Due to far lower salinity and chloride levels present in stormwater than in wastewaters, the knowledge so far on the ECO disinfection performance cannot simply be used for stormwater applications. This paper presents the first study on the feasibility of ECO technology for disinfection of pre-treated stormwater. Disinfection performance of *E. coli* was tested using a dimensional stable anode (DSA) in a series of batch experiments with synthetic stormwater of 'typical' chemical and microbial composition. The results showed that effective disinfection could be achieved with very low energy consumption; *e.g.* the current density of 1.74 mA/cm^2 achieved total disinfection in 1.3 minutes, using only 0.018 kWh per ton of stormwater treatment. Chlorination was found to be the key disinfection mechanism, despite the synthetic stormwater containing only 9 mg/L of chloride. Real stormwater collected from three stormwater treatment systems in Melbourne was then used to validate the findings for indigenous microbe species. Disinfection below the detection limit was achieved for stormwater from the two sites where chloride levels were 9 and 200 mg/l, respectively, but not for the third site where stormwater contained only 2mg/L chloride. Unfortunately, deterioration of the DSA anode was observed after only 8-10 h of its cumulative operation time, very likely due to high voltage that had to be applied to low saline stormwater to achieve the required current density. In conclusion, ECO