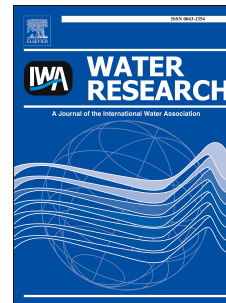


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Stormwater disinfection using electrochemical oxidation: A feasibility investigation

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2 A feasibility investigation

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10 **ABSTRACT**

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

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