

Evaluation of mixed oxidants generated by an electrochemical method

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ABSTRACT

Mixed oxidants produced by means of an electrochemical method were evaluated to confirm the presence of oxidants other than free chlorine. Inactivation rate of *B. subtilis* spore on the mixed oxidants were similar with that on free chlorine. Activation energy of mixed oxidants and free chlorine for *B. subtilis* spore inactivation at pH 8.3 were determined as 30.8 kJ·mol⁻¹ and 34.7 kJ·mol⁻¹ respectively. UV absorption spectrum of both free chlorine and mixed oxidants were compared. Molar extinction coefficients of free chlorine and mixed oxidants at 292 nm, which is the maximum absorption wavelength of OCl₂, were 357 M⁻¹ cm⁻¹ and 377 M⁻¹ cm⁻¹, respectively. Disinfectant decay rate and formation rate of THM on sand filtration effluent at SWTP were compared. The disinfectant decay rate followed a first-order reaction for both mixed oxidants and chlorine. In order to evaluate the effect of secondary disinfection, the decay rate of chlorine followed by mixed oxidants was evaluated compared with chlorine secondary disinfection. The formation rate of THM on both mixed oxidants and chlorine show an insignificant difference. In consequence, most of the oxidants in mixed oxidants are hypochlorite.

Keywords: *B. subtilis*; Disinfectant; Inactivation; Mixed oxidants

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