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The electrochemical removal of bacteria from drinking water

Solmaz Gholami, Maziar Naderi, Mahmood Yousefi, Masoumeh Moghaddam Arjmand*

Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran, email: Solmaz.gholami1993@gmail.com (S. Gholami), Maziar.naderi@gmail.com (M. Naderi), Mahmood_yousefi70@yahoo.com (M. Yousefi), arjmand@sina.tums.ac.ir (M.M. Arjmand)

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ABSTRACT

Effective disinfection is a particular stage of drinking-water treatment and is an important process for the removal of pathogenic microorganisms from the water. Germs resistant to common disinfectants are a major challenge in drinking water treatment across the world. The present study was conducted to compare the electrochemical removal of *Escherichia coli* and spores of *Bacillus subtilis* as indicative and resistant bacteria in drinking water, respectively. A reactor designed with a capacity of 200 cc and containing steel electrodes was selected for the reactions. The number of bacteria (CFU/mL), the electrochemical reaction time (min), the voltage (v), the electric current intensity (mA), ambient temperature of 25°C and natural pH of drinking water (7.4) were fixed as the operating parameters of the study. Based on the findings of this study, after applied voltage, reaction time is the most effective factor in increasing microbial removal efficiency. The optimal reaction time for the removal of *Bacillus subtilis* spores, *Bacillus subtilis* and *E. coli* was 5, 90 and 120 min, respectively. By establishing a potential difference of 4.5 and 8 V in the reactor, the number of *Bacillus subtilis* spores after the expiry of 2 h was 2 CFU/mL and 0 CFU/mL, respectively.

Keywords: Electro chemistry; *Escherichia coli*; Spore; Water disinfection

*Corresponding author.