Short Communication

Removing *Bacillus subtilis* spores from drinking water using a bipolar electrochemical method

Masuma Moghaddam Arjmand^{1,2}, Abbas Rezaee^{1,*}, Simin Nasseri³, Seyyed Said Eshraghi⁴

¹ Department of Environmental Health Engineering, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran.

² Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Science, Tehran, Iran.

³ Department of Environmental Health Engineering, School of Public health, and Center for Water Quality Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran

⁴ Department of Pathobiology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.

*E-mail: rezaee@modares.ac.ir

doi: 10.20964/2016.12.54

Received: 30 August 2016 / Accepted: 19 October 2016 / Published: 10 November 2016

Inactivation ability of persistent microorganisms, is great advantage of desirable disinfection method. As the main factor involved in the waterborne transmission of gastroenteritis, *Cryptosporidium* is highly resistant to conventional disinfection methods and is a major challenge to water supply systems across the world. In the assessment of water quality, the use of a bacterial spore model is recommended as a surrogate to the actual use of *Cryptosporidium*. In recent years, electrochemical processes have become more emphasized as eco-friendly and efficient technologies in water treatment and disinfection. The present study was conducted to present a suitable strategy for improving the quality of drinking water. The bipolar electrochemical system examined consisted of an anode electrode, a cathode electrode and two bipolar electrodes all made of stainless steel with dimensions of 4×8 cm and distanced 1 cm apart from each other in a glass reactor containing 200 cc of drinking water. The monopolar one, design by the same figuration, only without the two bipolar electrodes. The variables examined included *Bacillus subtilis* spore counts of 10²-10⁴ CFU/mL, an electrochemical reaction time ranging from 15 to 60 min, a current density of 2-5 mA/cm² and normal-pH and normal-temperature water. The findings showed that, while improving the system's current and accelerating the electrochemical reactions, bipolar electrochemical systems are capable of the full removal of *Bacillus subtilis* spores with a current density of 5 mA/cm² and an electrochemical reaction time of 60 minutes.

Keywords: Bipolar electrochemical methods, water disinfection, *Bacillus subtilis* spores

[FULL TEXT](#)

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).