

## عنوان مقاله:

A novel electro-Fenton process for removal of methicillin-resistant Staphylococcus aureus from hospital wastewater

## محل انتشار:

بیستمین کنگره بین المللی میکروب شناسی ایران (سال: 1398)

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## خلاصه مقاله:

**Introduction and Objectives:** The presence of antibiotic-resistant bacteria in hospital wastewater and then releasing antibiotic resistance genes in the aquatic environment have become a great threat to human health. Methicillin-resistant Staphylococcus aureus (MRSA) is a common bacterium in hospital, sometimes can cause fatal infections worldwide. Therefore, the current study aimed to evaluate the efficiency of electro-Fenton (EF) process for removing MRSA from hospital wastewater. **Materials and Methods:** Response surface methodology (RSM) under the central composite design (CCD) category of Design Expert 11 software used to achieve efficient removal of MRSA. The main objective of the CCD method is to optimize the response surface and quantifies the relationship between the controllable input parameters and the obtained response surfaces. The isolated and characterized MRSA from hospital wastewater determined with chemical and molecular methods. The effect of various variables including H<sub>2</sub>O<sub>2</sub> dosage, current density, initial MRSA concentration and reaction time investigated to achieve the best efficient MRSA removal condition. **Results:** Statistical tests (ANOVA and regression) showed that the designed model was in satisfactory agreement with the obtained experimental results. The kinetics of the process follows the pseudo-first-order model. Using ordinary radical scavengers demonstrated that hydroxyl radical ( $\bullet$ OH) was the main oxidant species contributed to the degradation of MRSA under the EF process. The normal plot of residuals demonstrated revealed that the linear curve of normal probability versus the internal residuals was reasonably close to a straight line. **Conclusion:** The EF process as an environmentally friendly treatment method was optimized and applied successfully for efficient removal of MRSA from hospital wastewater samples using response surface methodology in the current work.

## کلمات کلیدی:

Methicillin-resistant Staphylococcus aureus; Removal; Hospital wastewater; Electro-Fenton process; Response

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