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Data Article

Removal of the metronidazole from aqueous solution by heterogeneous electro-Fenton process using nano-Fe_3O_4

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A R T I C L E I N F O

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A B S T R A C T

Among drugs, antibiotics have a significant place due to their wide consumption in veterinary and human medicine to prevent and treat microbial infections. In spite of low amounts of antibiotics in the aquatic environments, the repeated incidence of antibiotics has been caused bacterial persistence and adverse effects on health human and aquatic life. Current article evaluated the removal of metronidazole (MNZ) via heterogeneous electro-Fenton (EF) process by nano-Fe_3O_4. The response surface methodology (RSM) on Box-Behnken design was applied for modeling and optimization experimental factors such as pH, applied current, and catalyst load. The efficiency of the EF process was maximum (92.26%) under the optimal condition for MNZ removal i.e. 70 mg/L of initial MNZ concentration, pH of 3, and 200 mA applied current and 30 min time and 3.2 kWh/m^3 of energy consumption.

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Specifications Table

Subject area	Environmental engineering
More specific subject area	Advanced oxidation process
Type of data	Figure and table
How data was acquired	All degradation tests were done in a reactor 250 mL, equipped with two electrodes graphite- felt (cathode) and platinum sheet (anode).Three level of each variable was evaluated using BOX-Behnken design. The concentration of MNZ was determined by high performance liquid chromatography (HPLC). The characteristic of nano-catalyst was analyzed using field emission scanning electron microscopy (FESEM) (Mira 3-XMU).
Data format	Analyzed
Experimental factors	Measuring of MNZ concentration under various levels of solution pH, catalyst load and applied current to obtain optimal MNZ removal from aqueous solution.
Experimental features	MNZ degradation by EF process using nano-Fe_3O_4
Data source location	Iran University of medical sciences, Tehran, Iran
Data accessibility	Data are present in this article only.

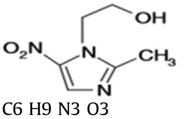
Value of data

- The nano-Fe_3O_4 is reusability and has great stability upon recycling.
- The Box-Behnken design is a useful method to optimize MNZ removal from aqueous solution.
- The obtained data shows heterogeneous EF process by nano-Fe_3O_4 an appropriate method for MNZ removal from aqueous solution.

1. Data

This brief dataset explains the use of EF process using nano-Fe_3O_4 for MNZ removal from aqueous solution. Physicochemical characteristics of MNZ are shown in Table 1. Table 2 shows levels of independent variables and experimental range in Box-Behnken design. Box-Behnken design (BBD) was used as a response surface method for optimization of EF process that experimental design and results of MNZ removal have been presented in Table 3. The ANOVA obtained is shown in Table 4 and P-value < 0.05 indicate that the model is significant [1,2]. Also, three variables (initial MNZ concentration, Fe_3O_4 dose and pH) were significant terms with p-value < 0.05 [3]. The result of FESEM image of Fe_3O_4 was presented in Fig. 1. The recyclability of catalyst was evaluated by seven continuous

Table 1
Physicochemical characteristics of MNZ [4].

Molecular structure	
Molecular formula	C6 H9 N3 O3
Molecular weight ($g\,moL^{-1}$)	171.15
Melting point (°C)	159–163
Water solubility ($g\,L^{-1}$)	9.5
pKa	2.55

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