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Data Article

Data on modeling of UV/$Na_2S_2O_8$/FeS_2 process in amoxicillin removal using Box-Behnken methodology

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ABSTRACT

Among the pharmaceutical compounds, antibiotics have been paid specific consideration, due to their acute and chronic toxic effects on organisms. Amoxicillin (AMX) is used widely for treatment of bacterial infections. About 80% of amoxicillin excreted unchanged and enters the aquatic environment through different routes including disposal of municipal wastewaters, hospital wastewaters and farm wastewaters. In this study degradation of amoxicillin by UV/$Na_2S_2O_8$/FeS_2 process was evaluated. According to the results, the R-squared and adjusted R-squared were 0.9877 and 0.9828, respectively. The AMX removal efficiency was 93% at optimum conditions. Thus, UV/$Na_2S_2O_8$/FeS_2 process is a useful process for amoxicillin removal.

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Specifications Table

Subject area	Environmental engineering
More specific subject area	Advanced oxidation process
Type of data	Figures and tables
How data was acquired	All degradation tests were done in a reactor batch (Volume of 1 L), equipped with a UV-C lamp (16 W). Three level of each parameter was evaluated using BOX-Behnken design. A High Liquid Performance Chromatography (HPLC) was used for the determination of AMX concentration.
Data format	Analyzed
Experimental factors	Measuring of AMX concentrations under various levels of initial AMX concentration, solution pH, Persulfate concentration, dose of FeS_2 and contact time to obtain optimum AMX removal from aqueous solutions.
Experimental features	Optimization of AMX degradation using BOX-Behnken design.
Data source location	Iran University of Medical sciences, Tehran, Iran
Data accessibility	Data are available within paper.

Value of data

- The synthesized catalyst has properties include earth abundant, low cost, high absorption coefficient and good photocatalytic activity. Also, pyrite catalyst is reusable.
- This research shows a statistical method (Box-Behnken design) to optimize AMX removal from aqueous solution.
- The obtained data will be appropriate for AMX removal from water and wastewater.

1. Data

The level of variables and their codes are shown in Table 1. For optimization of UV/$Na_2S_2O_8$/FeS_2 process, Box-Behnken design (BBD) was applied as a response surface method [1–3]. The adequacy of the model was checked using analysis of variance (ANOVA) (Table 2). P-values < 0.05 showed that the model is statistically significant [4]. Five variables (initial AMX concentration, pyrite dose, per sulfate concentration, time and pH) had linearly significant effect with p-value < 0.05. The R-Squared value (0.9828) is close to adjusted R-squared (0.9877) implying high importance of the model [5]. The diagrams of normal probability of the studentized residuals and the predicted against experimental values are shown in Figs. 1 and 2, respectively. Fig. 3 shows the interaction effects of variables on AMX removal efficiency. According to the results, a quadratic equation between dependent variable (AMX removal %) and independent variables was obtained as follows:

Table 1
Levels of independent variables and experimental range in Box-Behnken design.

Factors	Range and level		
	−1	0	+1
A: Initial AMX (mg/l)	10	40	70
B: catalyst load (g/L)	1	2	3
C: per sulfate concentration (mM)	0.5	2	3.5
D: Time(min)	30	45	60
E:pH	3	6	9