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## Data Article

# Q1 Characterization, kinetic, thermodynamic and isotherm data for diclofenac removal from aqueous solution by activated carbon derived from pine tree

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## ABSTRACT

The usage of low cost material as adsorbent would be admirable from environmental point of view. Thus, herein, this data set present a simple method for providing an adsorbent from activated carbon derived from pine tree. The prepared adsorbent was applied to remove diclofenac from aqueous solution. The characterization data of the adsorbent was analyzed using FTIR method. The FTIR test results showed that adsorbent has a functional group that is useful in adsorption process. It was conducted in laboratory scale and the adsorption technique was batch technique. The information regarding isotherms of diclofenac adsorption were listed. The Langmuir isotherm was suitable for correlation of equilibrium data with correlation coefficient value of 0.999. Adsorption of diclofenac by adsorbent from activated carbon follows pseudo second order model with correlation coefficient value ( $R^2$ ) of 0.9997. The data implied that the maximum adsorption capacity of adsorbent to uptake diclofenac from aqueous solution was obtained 54.67 mg/g. The acquired data indicated that the adsorption of diclofenac by the adsorbent prepared from activated carbon derived from pine tree is a promising technique for treating diclofenac bearing wastewaters.

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## Specifications Table

Subject area	Chemical Engineering
More specific subject area	Adsorption process
Type of data	Table, image, figure
How data was acquired	The uptake of diclofenac by the carbon nanotube as adsorbent ( $q_e$ ) was determined based on the subtraction of the initial and final concentration of adsorbate using a series of batch tests in a shaker- incubator instrument. Diclofenac concentration measurement was performed by spectrophotometer in 292 nm (Shimadzu, DR5000) Fourier transform infrared (FTIR) spectroscopy, was used for determine the characteristics of the adsorbent.
Data format	Analyzed
Experimental factors	The adsorbent of activated carbon derived from pine tree was prepared from heated in 400 °C for 2 h and activated in 800 °C for 2 h by N <sub>2</sub> gas. Data of activated carbon derived from pine tree were acquired for diclofenac removal from aqueous solution
Experimental features	The adsorbent of activated carbon derived from pine tree for diclofenac adsorption from aqueous solution.
Data source location	Guilan University of medical sciences, Rasht, Iran
Data accessibility	Data are accessible with the article

## Value of the data

- The synthesized adsorbent has great potential application in related of pollutants removal from aqueous solution.
- Information of this data article including, isotherm, kinetic, and thermodynamic parameters will be informative for modeling and predicting the adsorption capacity and mechanism of diclofenac removal by activated carbon.
- The acquired data will be advantageous for the scientific community wanting to scale up and design an adsorption column with adsorbent of activated carbon as medium for the removal of diclofenac containing waters or wastewaters.

## 1. Data

The FTIR for the activated carbon adsorbent before and after adsorption at wave numbers from 400 to 4000 cm<sup>-1</sup> were given in Fig. 1. The kinetics, isotherms, and thermodynamic parameters were estimated using models listed in Table 1. The data of isotherms, thermodynamic and kinetics for adsorption of diclofenac onto activated carbon is presented in Tables 2 and 3.

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