



“The 3<sup>rd</sup> International and 21<sup>st</sup>  
national Conference on environmental Health”  
February 26-28, 2019  
Zanjan, Iran

## The efficiency of activated carbon prepared from beech tree be magnetized nanoparticles by Fe<sub>3</sub>O<sub>4</sub> to remove Cephalexin from aqueous solution: Isotherm and kinetic's study of adsorption process

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### Abstract

**Objectives:** In the recent years, antibiotics have been introduced as new pollutants in water. The discharge of antibiotics has led to hazardous and serious effects on human health. Activated carbon with high especial porosity has been widely used as an adsorbent for contaminants. The objective of this study was to prepare activated carbon by Fe<sub>3</sub>O<sub>4</sub> and evaluate its efficiency on the removal of cephalexin antibiotic from aqueous solution.

**Methodology:** The Physical and structural characteristics of adsorbents were analyzed by using FESEM, VSM techniques. In order to determine the adsorption parameters, isotherms and kinetics models were used. The effects of some parameters such as pH, absorbent dose, initial concentration of cephalexin and contact time were studied.

**Results:** The results showed that the optimum conditions for absorption process were pH =3, contact time 30 min, absorbent dose 2 g/l. Isotherm data showed that the process followed both kinetic and Freundlich isotherm models with the regression coefficient of 0.9216 and 0.9996, respectively.

**Conclusion:** The results of this study showed that the magnetized activated carbon, in addition to easy separation of magnets has been very effective in adsorption and removal of cephalexin from aqueous solution. Therefore, activated carbon can be used to remove contaminants from the aquatic environment

**Keywords:** cephalexin, activated carbon, adsorption, isotherm, nanoparticles, Fe<sub>3</sub>O<sub>4</sub>