

## Accepted Manuscript

A novel natural chitosan/activated carbon/iron bio-nanocomposite: Sonochemical synthesis, characterization, and application for cadmium removal in batch and continuous adsorption process

Hakimeh Sharififard, Zahra Hashemi shahraki, Elham Rezvanpanah, Somayeh Hosseini Rad

PII: S0960-8524(18)31347-6  
DOI: <https://doi.org/10.1016/j.biortech.2018.09.094>  
Reference: BITE 20510

To appear in: *Bioresource Technology*

Received Date: 11 August 2018  
Revised Date: 16 September 2018  
Accepted Date: 17 September 2018

Please cite this article as: Sharififard, H., shahraki, Z.H., Rezvanpanah, E., Rad, S.H., A novel natural chitosan/activated carbon/iron bio-nanocomposite: Sonochemical synthesis, characterization, and application for cadmium removal in batch and continuous adsorption process, *Bioresource Technology* (2018), doi: <https://doi.org/10.1016/j.biortech.2018.09.094>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



A novel natural chitosan/activated carbon/iron bio-nanocomposite: Sonochemical synthesis, characterization, and application for cadmium removal in batch and continuous adsorption process

Hakimeh Sharififard<sup>1,\*</sup>, Zahra Hashemi shahraki<sup>1</sup>, Elham Rezvanpanah<sup>2</sup>, Somayeh Hosseini Rad<sup>3</sup>

<sup>1</sup>Chemical Engineering Department, Yasouj University, Yasouj, I. R. Iran; Email:

[Hakimeh.sharifi@gmail.com](mailto:Hakimeh.sharifi@gmail.com)

<sup>2</sup>Polymer Engineering Department, Amirkabir University of Technology, Tehran, I.R. Iran.

<sup>3</sup>Polymer Engineering Department, Urmia University, Urmia, I.R. Iran

## Abstract

The natural chitosan was synthesized using shrimp shells via sonochemical method, and activated carbon produced from grape stalks biomass. The novel bio-nanocomposite of chitosan/activated carbon/iron nanoparticles was synthesized via the sonochemical method and characterized using FTIR, SEM, and BET techniques. This bio-based nanocomposite was utilized to cadmium removal from dilute solution. The adsorption process via batch method was optimized, and the impacts of pH of feed, the dosage of adsorbent, and concentration of cadmium were analyzed. The kinetics and equilibrium analysis was done, and results indicate the predomination of chemical absorption and the single-layer adsorption process. Langmuir data indicates that the synthesized bio-nanocomposite can adsorb 344 mg cadmium per each gram. To evaluate the ability of the synthesized nanocomposite in the industrial application, the adsorption tests were done in a continuous adsorption system in three cycles.

**Keywords:** Natural chitosan, Activated carbon, Iron nanoparticles, Adsorption, Cadmium

---

<sup>1</sup> Corresponding author

Download English Version:

<https://daneshyari.com/en/article/11029954>

Download Persian Version:

<https://daneshyari.com/article/11029954>

[Daneshyari.com](https://daneshyari.com)