

Performance evaluation of agro-based adsorbents for the removal of cadmium from wastewater

Sohail Ayub^a, Ali Akbar Mohammadi^b, Mahmood Yousefi^c, Fazlollah Changani^{c,*}

^aDepartment of Civil Engineering, AMU, Aligarh, UP, India, email: sohailayub@rediffmail.com

^bDepartment of Environmental Health, Neyshabour University of Medical Sciences, Neyshabur, emails: mohammadi.eng73@gmail.com, mohammadia3@num.s.ac.ir

^cDepartment of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran, emails: changani_f@yahoo.com, changani39@gmail.com (F. Changani), Mahmood_yousefi70@yahoo.com (M. Yousefi)

Received 2 May 2018; Accepted 9 November 2018

ABSTRACT

An effort has been made in the present research to evaluate the agro-based adsorbents such as coconut shell, walnut shell, and almond shell for the removal of cadmium from electroplating industrial effluent. Adsorption experiments were conducted to evaluate the performance. The highest removal efficiency for Cd(II) is 83.7% at pH 6.5 for coconut shell-activated carbon. The percentage removal of cadmium increases with the decrease in metal concentration. The extent of removal depends on the metal ion concentration, adsorbent dose, contact time, and particle size. Coconut shell is found to be more effective with respect to removal efficiency. Cadmium adsorption follows second-order rate equation for coconut shell. The isotherm data obtained more closely follow the Freundlich adsorption isotherm for coconut shell, while walnut shell and almond shell follow the Langmuir adsorption isotherm better. The coconut shell has the highest potential to remove cadmium ion from electroplating wastewater.

Keywords: Cadmium; Wastewater; Agro based; Adsorption

* Corresponding author.