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SEQUESTRATION OF COPPER (II) FROM SIMULATED WASTEWATER USING PRE–TREATED RICE HUSK WASTE BIOMASS

Manjeet Bansal[1], Ackmez Mudhoo[2*], Vinod Kumar Garg[3,4], Diwan Singh[5]

[1]Department of Civil Engineering, Punjab Technical University, Giani Zail Singh Campus, Bathinda, Punjab, India
[2]Department of Chemical and Environmental Engineering, Faculty of Engineering, University of Mauritius, Réduit, Mauritius
[3]Department of Environmental Science and Engineering, Guru Jambheshwar University of Science and Technology, Hisar 125001, Haryana, India
[4]Present address: Centre for Environmental Sciences and Technology, Central University of Punjab, Bathinda 151001, Punjab, India
[5]Department of Civil Engineering, National Institute of Technology, Kurukshetra 136119, India

Abstract

This paper reports the potential of rice husk waste biomass to remove copper (II) from simulated wastewater under different experimental conditions. For this, rice husk has been pre–treated by boiling, formaldehyde and concentrated sulphuric acid. Fourier Transform Infrared Spectroscopy, Scanning Electron Microscopy and Energy dispersive analysis X–ray analyses were performed before and after adsorption, to explore number and position of the functional groups available for copper (II) binding on to studied adsorbents and changes in adsorbent surface morphology. Effect of various process parameters, namely, pH, adsorbent dose, initial copper (II) concentration and contact time has been studied in batch systems. The removal of copper (II) was dependent on the kind of pre–treatment, physico–chemical characteristics of the adsorbent, copper (II) concentration and other studied process parameters. The optimum pH was 5.0 for copper (II) ion removal. The experimental data were analyzed using Freundlich, Langmuir, Dubinin–Radushkevich (D–R) and Temkin isotherm models. It was found that Freundlich and Langmuir models fitted better and well. The results revealed that the copper (II) is considerably adsorbed on the prepared adsorbents and it could be an economical method for heavy metal sequestration from wastewaters. The process followed the pseudo–second order reaction kinetics.

Key words: adsorption, copper, FTIR, EDAX, rice husk, SEM

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[*] Author to whom all correspondence should be addressed: e-mail: ackmezchem@yahoo.co.uk; Phone: +230 7584279; Fax: +230 4657144