



Batch removal of chromium (VI) from aqueous solutions using wheat shell as adsorbent: process optimization using response surface methodology

Papita Das Saha^{a,*}, Apurba Dey^a, Pritam Marik^b

^aDepartment of Biotechnology, National Institute of Technology – Durgapur, Mahatma Gandhi Avenue, Durgapur (WB) 713209, India
Tel. +913432754036; Fax: +913432547375; email: papitasaha@gmail.com

^bDepartment of Geology, National Institute of Technology – Durgapur, Mahatma Gandhi Avenue, Durgapur (WB) 713209, India

Received 6 April 2011; Accepted 25 August 2011

ABSTRACT

The biosorption potential of wheat (*Triticum aestivum*) shells to remove hexavalent Chromium (Cr^{+6}) ions from aqueous solutions was investigated in batch mode experiments. The equilibrium adsorption level was determined and it was observed that equilibrium adsorption of chromium was function of the solution contact time and initial metal concentration. The effect of solution pH on biosorption was also studied. From experimental results it was observed that the biosorptive capacity of the shell was dependent on the pH and initial Cr (VI) ions concentration. The Freundlich and Langmuir constants for biosorption of chromium (VI) on wheat shells were determined and it was observed that the adsorption data fit well with the Langmuir isotherm model. To optimization of this process response surface methodology (RSM) was utilized. The regression equation was obtained using Design Expert 7.0 software. Predicted values thus obtained were closed to experimental value indicating suitability of the model.

Keywords: Chromium; Biosorption; Batch and continuous study; Response surface methodology; Regression analysis; Wheat shell

*Corresponding author.