

## **Thermodynamics, Kinetics and Equilibrium Adsorption of CR (VI) and HG (II) in Aqueous Solution on Corn Husk (Zea Mays)**

**Juan Núñez Zarur<sup>1</sup>, Candelaria Tejada Tovar<sup>2</sup>, Angel Villabona Ortiz<sup>3</sup>,  
Diofanor Acevedo<sup>4\*</sup>, Ronald Tejada Tovar<sup>5</sup>**

<sup>1,2,3,5</sup>Faculty of Engineering, Chemical Engineering Program, Process Design and  
Biomass Utilization Research Group (IDAB), University of Cartagena, Bolívar 195,  
Colombia.

<sup>4</sup>Faculty of Engineering, Research Group Innovation, Agricultural and Agro-industrial  
Development, University of Cartagena Av. El Consulado, St. 30 No. 48-152. Colombia.

**Abstract:** The use of agroindustrial waste as low-cost adsorbents in water treatment is an option over conventional technologies. In the present investigation, a thermodynamic, kinetic and equilibrium study of the adsorption of chromium (VI) and mercury (II) ions from corn husk biomass (Zea mays) was carried out, determining the functional groups in the biomass surface by means of FTIR analysis. Hydroxyl, carboxylic and aliphatic groups were found to be the major contributors to the metal removal process. Batch adsorption tests were carried out, varying the pH, temperature and particle size. pH was established to be the most influential factor; the highest adsorption capacity was given at pH=2 for chromium and pH=6 for mercury, at a temperature of 25°C and particle size of 0.355mm. A maximum adsorption capacity of Cr (VI) was reached of 17.30 mg/g (86%) and 18.85 mg/g (94.3%) for Hg (II). The kinetic model that best fitted the experimental data was Elovich and the isotherm that best described the process was Freundlich. The thermodynamic parameters ( $\Delta H^0$ ,  $\Delta G^0$ ,  $\Delta S^0$ ) suggest that the removal process is favourable, spontaneous, reversible and endothermic. The results show that corn husk is a good alternative as an adsorber of chromium and mercury.

**Keywords:** Freundlich's isotherm, Elovich model, thermodynamic parameters, adsorption thermodynamics.

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