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## HEAVY METAL REMOVAL FROM WASTEWATER USING SILICA- IMMOBILIZED HUMIN

<sup>1</sup>G. de la Rosa, <sup>2</sup>J.L. Gardea-Torresdey, <sup>1</sup>J.R. Peralta-Videa, and <sup>2</sup>I. Herrera

<sup>1</sup>*Department of Environmental Science and Engineering, 500 W. University Ave, University of Texas at El Paso, El Paso, TX 79968; Phone: (915)747-5847; Fax: (915)747-5748.*

<sup>2</sup>*Department of Chemistry, 500 W. University Ave, University of Texas at El Paso, El Paso, TX 79968; Phone: (915)747-5359; Fax: (915)747-5748.*

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### ABSTRACT

Traditional methods used for the removal of heavy metals from the environment are in general expensive and potentially risky due to the possibility of hazardous by-products generation. Recently, attention has been directed to development of alternative methodologies such as use of organic materials as biosorbents. These methods represent environmental friendly and cost-effective possibilities for the elimination of heavy metal contaminants from aqueous environment. Previous batch studies showed that humin extracted from peat moss has a high capacity to remove heavy metals from aqueous solutions. In this investigation, column experiments were performed in order to study the adsorption of Cd(II), Cu(II), Cr(III), Ni(II), and Pb(II) by silica-immobilized humin under flow conditions. We evaluated the binding capacity and the recycling of the biomass. Results showed that this material is a suitable biosorbent for Cu(II), Pb(II), and Cr(III) removal from aqueous solution under flow conditions. The capacity of the column in milligrams of metal bound per gram of biomass was 26, 8, and 4.5 for Pb(II), Cr(III), and Cu(II), respectively. This new material has shown its potentiality to be used for treatment of metal-contaminated wastewaters. Information obtained herein is also significant in understanding the role that humic substances play in the fate and transport of heavy metals in soils and aquatic environments.

**Key words:** humin, biosorbent, column studies, heavy metal, humic substances