



“Gheorghe Asachi” Technical University of Iasi, Romania



CHROMIUM (III) TANNED LEATHER WASTE AS AN ALTERNATIVE ADSORBENT OF DICLOFENAC SODIUM FROM WATER

Ingridy Alessandretti¹, Cesar Vinicius Tonicioli Riguetto², Marieli Rosseto²,
Aline Dettmer^{1,3*}

¹University of Passo Fundo (UPF), Faculty of Engineering and Architecture (FEAR), Chemical Engineering Course, Passo Fundo, Rio Grande do Sul, Brazil

²Federal University of Santa Maria (UFSM), Rural Science Center, Postgraduate Program in Food Science and Technology (PPGCTA), Santa Maria, RS, Brazil

³University of Passo Fundo (UPF), Faculty of Agronomy and Veterinary Medicine (FAMV), Postgraduate Program in Food Science and Technology (PPGCTA), Passo Fundo, Rio Grande do Sul, Brazil

Abstract

This work evaluated the potential of Chromium (III) tanned leather waste (CTLW) as an adsorbent for the removal of diclofenac sodium from aqueous media. CTLW were characterized according to the moisture, ash, pH, total nitrogen, chromium content, chemical groups identification, surface area, and porosity. After, pH adsorption, equilibrium, and kinetics assays were performed. Additionally, to verify whether there was a transfer of chromium from the CTLW to the aqueous medium after adsorption, total chromium determination in the aqueous solutions was also carried out. The surface area and average pore diameter of the adsorbent were $1.4374 \text{ m}^2 \text{ g}^{-1}$ and 22.1 nm , respectively. A greater removal (79.7%) was observed at pH 5. Based on the parameters of the Redlich-Peterson model, there was a tendency to fit the Langmuir model, which presented a monolayer adsorption capacity of 121.36 mg g^{-1} . The equilibrium time was obtained after 150 min, in which the Weber and Morris model indicated adsorption by internal and external mass transfer. In the total chromium detection assay, a value below the quantification limit of the technique ($<0,002 \text{ mg Cr L}^{-1}$) was obtained, which was within the limits established for drinking water in international regulations. In general, Chromium (III) tanned leather waste has the potential for the adsorption of diclofenac sodium.

Key words: adsorption, emerging contaminant, pharmaceutical product, tannery waste

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* Author to whom all correspondence should be addressed: e-mail: alinedettmer@upf.br, Phone number: +555433168269