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AGRI-WASTES AS A LOW-COST ADSORBENT FOR NICOSULFURON HERBICIDE

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Abstract

The contamination of aquatic and terrestrial environments by pesticides is highlighted by their possible toxic properties and poor biodegradability on the environment. The development of low cost by products from agricultural sectors as a suitable solution for contaminated areas remediation is of great environmental interest. Straw wastes can be considered as a promising alternative to remove different chemical compound that are environmentally toxic.

In this study, some materials derived from agricultural (agri)-wastes (wheat and corn straw) in mixture with soil, were investigated as potential adsorbents for nicosulfuron removal. After mineralization (850°C) and KOH activation to obtain the biochars, the samples were structurally characterized by scanning electron microscopy and Fourier transform infrared spectroscopy. Interaction studies between nicosulfuron - biochars and soil were performed at various concentrations and pH of 7. The adsorbent capacity was evaluated using batch sorption test and liquid chromatography coupled with mass spectrometry. The characterization results showed different functional groups present in the structure of these biochars while surface analysis showed an increase of surface roughness. The Langmuir isotherm and pseudo second order mechanism describes the kinetics of nicosulfuron herbicide. The results obtained highlight the importance of agri-waste as a natural adsorbent, being a solution for the removal of nicosulfuron from contaminated environments.

Key words: adsorption, agri-wastes, nicosulfuron, soil, straw

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