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SUGARCANE BAGASSE AND PEANUT SHELL FOR THE SYNTHESIS OF MAGNETIC BIO-COMPOSITES AS ADSORBENT MATERIALS FOR PESTICIDES REMOVAL

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In the present study two industrial wastes were recycled in order to synthetized two magnetic bio-composites for the removal of the pesticides carbofuran and iprodione from aqueous solutions. Sugarcane bagasse and peanut shell are common agro industrial wastes in Mexico. They barely have applications as raw material for industrial processes. Despite of being biodegradable materials their generation in large quantities make them environmental liabilities that create pollution. Composites magnetite/sugarcane-bagasse (MBO) and magnetite/peanut-shell (MPSo) were synthetized and applied as adsorbent materials. MBo and MPSo were synthesized by a co-precipitation process. They were characterized by Raman spectroscopy; transmission electron microscopy, scanning electron microscope and Fourier transform infrared spectroscopy. The removal was carried out by the batch adsorption process under the same conditions of concentration, amount of adsorbent, temperature and contact time. The spectrophotometric technique was adopted for the estimation of concentration of pesticides before and after the adsorption. The kinetic data were applied on pseudo-first order, pseudo-second order and Elovich models. The Elovich model described better all systems. The isotherm models applied were Langmuir, Freundlich, Sip, Temkin, Redlich-Peterson and Dubinin–Radushkevich. Isotherms experimental data of carbofuran and iprodione can be best described by more than one model, according to the statistics parameters, but in general, the process took place by a chemical adsorption since Sip model was a common equation in all systems. The maximum adsorption capacities for carbofuran were 175 and 89.3 mg/g, for iprodione were 119 and 2.76 mg/g for MBo and MPSo, respectively.

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