



Removal of atrazine from aqueous solution using untreated and sulphuric acid treated maize cobs biomass.

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Abstract: The increasing agricultural activities have led to discharge of herbicides in the environment. There is need to develop ways of removing herbicides from the environment as they pollute the environment. In this study the possibility of using untreated and sulphuric acid treated maize cobs to remove the herbicide atrazine from aqueous solution was investigated. The effect of initial concentration of atrazine, pH and temperature on adsorption was studied. The adsorption studies were conducted in the concentration range of 25ppm to 100ppm, pH range of 2 to 10 and temperature range of 30°C to 80°C. The results obtained indicate that pH value of 5 and temperature of 30°C cause optimum adsorption of atrazine. The experimental data fitted well the Langmuir adsorption isotherm. Fourier Transform Infrared spectroscopy was used to identify the functional groups on the surface of the adsorbents. Functional groups typical of lignocellulosic materials were observed. Surface morphology was studied using scanning electron microscopy. The results obtained suggest that sulphuric acid treatment changed the surface of the adsorbent by increasing the number of pores. The maximum adsorption capacity was 99.8% for acid treated maize cobs and 99.4% for untreated maize cobs. Thermodynamic parameters, ΔG° , ΔH° and ΔS° were determined and their values suggest the atrazine adsorption is spontaneous and endothermic. The results of this present study suggest that sulphuric acid treated maize cobs biomass and untreated maize cobs biomass can be used as efficient low cost biosorbents for the adsorption of atrazine from aqueous solution.

Keywords: Atrazine adsorption, acid treated biosorbents, adsorption isotherms.