



Activated carbons from potato peels: The role of activation agent and carbonization temperature of biomass on their use as sorbents for bisphenol A uptake from aqueous solutions

An Arampatzidou and Eleni A. Deliyanni

Laboratory of General & Inorganic Chemical Technology, Department of Chemistry, Aristotle University of Thessaloniki, Thessaloniki GR 541 24, Greece

Activated carbons prepared from potato peels, a solid waste by product, and activated with different activating chemicals, have been studied for the adsorption of an endocrine disruptor (Bisphenol-A) from aqueous solutions. The potato peels biomass was activated with phosphoric acid, KOH and ZnCl₂. The different activating chemicals were tested in order the better activation agent to be found. The carbons were carbonized by pyrolysis, in one step procedure, at three different temperatures in order the role of the temperature of carbonization to be pointed out. The porous texture and the surface chemistry of the prepared activated carbons were characterized by Nitrogen adsorption (BET), Scanning Electron Microscope (SEM), thermal analysis (DTA) and Fourier Transform Infrared Spectroscopy (FTIR). Batch experiments were performed to investigate the effect of pH, the adsorbent dose, the initial bisphenol A concentration and temperature. Equilibrium adsorption data were analyzed by Langmuir and Freundlich isotherms. The thermodynamic parameters such as the change of enthalpy (ΔH^0), entropy (ΔS^0) and Gibb's free energy (ΔG^0) of adsorption systems were also evaluated. The adsorption capacity calculated from the Langmuir isotherm was found to be 450 mg g⁻¹ at an initial pH 3 at 25 °C for the phosphoric acid activated carbon, that make the activated carbon a promising adsorbent material.