Removal of caffeine and diclofenac from aqueous solutions by adsorption on a multiwall carbon nanotube

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Abstract

Batch sorption experiments were performed to study the adsorption of two emerging pollutants from aqueous solutions using a commercial multiwall carbon nanotube as adsorbent. Caffeine and diclofenac were selected as representative contaminants. The multiwall carbon nanotube from Sigma-Aldrich was characterized by nitrogen adsorption at -196ºC, and through the determination of pHpzc. The effect that several operational parameters, such as initial concentration of organic molecules, mass of adsorbent and contact time, may have on the sorption behavior was also evaluated. The contact time to attain equilibrium for maximum adsorption was found to be 40 min (see Figure 1-A). The kinetic data were fitted to several adsorption models and the adsorption process found to follow pseudo-second-order rate. The equilibrium adsorption data were analyzed using the Freundlich, Langmuir and Toth isotherm equation models (see Figure 1-B).

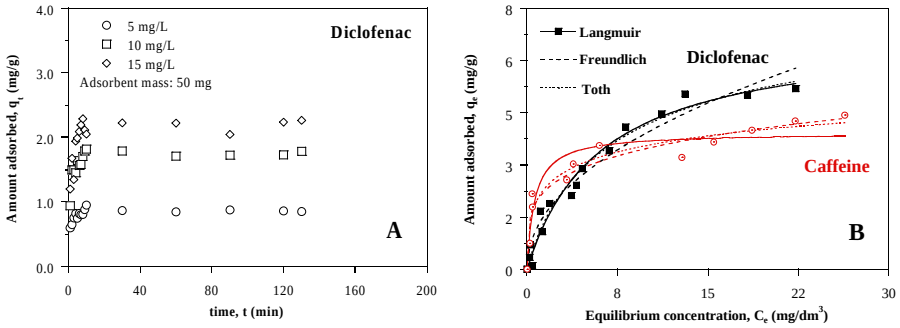

Figure 1: **A**-Kinetic adsorption data for diclofenac on the multiwall carbon nanotube at various concentrations of adsorbate. **B**-Adsorption isotherms for the equilibrium of caffeine and diclofenac on the multiwall carbon nanotube.

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