LIGNOCELLULOSIC DERIVED ACTIVATED CARBON MONOLITHS FOR EMERGING POLLUTANTS REMOVAL

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Activated carbons are materials of great interest due to their versatility. Most of the activated carbons are prepared mainly in the form of powder, however, in certain processes, the powder-like morphology implies, high pressure drops and diffusional problems. A possible way to overcome these drawbacks is to prepare carbon materials directly into monolithic shape. The use of activated carbons as adsorbents in liquid phase adsorption has been widely studied. In the last few years, the elimination of emerging pollutants, as pharmaceutical compounds, personal care products, etc.., has taking special interest, due to their increase in concentration in water and their low elimination in traditional waste water treatments plants.

In this work, the use of different lignocellulosic precursors for the preparation of activated carbon monoliths (ACMs) as adsorbents is presented. ACMs from olive stone, Alcell lignin and Kraft lignin have been prepared by chemical activation with H_3PO_4 using a home-made extruder. Furthermore, an ACM derived from a natural monolith shape precursor, as Hemp cane, and chemically activated with H_3PO_4, was also tested as ACMs adsorbent.

The adsorption of carbamazepine and paracetamol over these ACMs was analyzed at low concentrations (<10 mg/L) and at different temperatures (15, 25 and 35 ºC). Batch adsorption experiments were carried out in order to obtain the adsorption isotherms and the kinetic adsorption profiles. Adsorption capacities of 200 and 120 mg/g were obtained for carbamazepine and paracetamol, respectively, at low equilibrium concentrations. Moreover, the simultaneous adsorption of carbamazepine and paracetamol was also evaluated.