

Application of ACs from synthetic polymers blends on pesticides adsorption

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ABSTRACT TEXT

The application of pesticides is growing around the world, in particular on the developing countries, like East Timor. As it grows, also the health and environmental problems increase, with negative consequences for the current and coming generations.

In this work, the Polyethyleneterephthalate (PET) and Polyacrylonitrile (PAN) wastes mixtures were used in the production of activated carbons (ACs), by chemical activation with potassium hydroxide (KOH) or potassium carbonate (K₂CO₃), with different mass ratio precursors / chemical activating agent. These adsorbents present textural and chemical properties relevant to the application on pesticides removal from liquid-phase, namely because they are essentially microporous ACs, with high surface area and pore volume. As an example, samples activated with KOH achieved apparent surface area, pore volume and mean pore width, around 2100 m² g⁻¹, 0.94 cm³ g⁻¹ and 1.27 nm, respectively. For the activation with K₂CO₃, those parameters achieved maximum values around 2200 m² g⁻¹, 1.03 cm³ g⁻¹ and 1.28 nm, respectively.

Selected samples were tested on the adsorption of 2,4-dichlorophenoxyacetic acid (2,4-D) and 4-chloro-2-methylphenoxyacetic acid (MCPA), from the aqueous medium at 298 K. The maximum amount of MCPA and 2,4-D adsorbed was 2.8 and 2.6 mmol g⁻¹, respectively, for the samples activated with KOH, and 3.9 and 3.2 mmol g⁻¹, for MCPA and 2,4-D respectively, for the samples activated with K₂CO₃.

The results obtained in this work are very promising for those precursors presenting a range of potential applications, with particular emphasis in liquid-phase adsorption.