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# Carbon Nanomaterials from Agricultural Wastes for Adsorption of Organic Pollutions

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**Abstract :** Agricultural waste materials from traditional oil mill and after extraction of natural raw materials in supercritical conditions were used for the preparation of carbon nanomaterials (activated carbons) by two various methods. Chemical activation using acetic acid and physical activation with a gaseous agent (carbon dioxide) were chosen as mild and environmentally friendly ones. The effect of influential factors: type of raw material, temperature and activation agent on the porous structure characteristics of the materials was discussed by using $N_2$ adsorption/desorption isotherms at 77 K. Furthermore scanning electron microscope (SEM), transmission electron microscope (TEM), X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS) were employed to examine the physicochemical properties of the obtained sorbents. Selection of a raw material and an optimization of the conditions of the synthesis process, allowed to obtain the cheap sorbents with a targeted distribution of pores enabling effective adsorption of the model organic pollutants carried out in the multicomponent systems. Adsorption behavior (capacity and rate) of the chosen activated carbons was estimated by utilizing Crystal violet (CV), 4-chlorophenoxyacetic acid (4-CPA), 2.4-dichlorophenoxyacetic acid (2.4-D) as the adsorbates. Both rate and adsorption capacity of the organics on the sorbents evidenced that the activated carbons could be effectively used in sewage treatment plants. The mechanisms of organics adsorption were studied and correlated with activated carbons properties.

**Keywords :** activated carbon, adsorption equilibrium, adsorption kinetics, organics adsorption
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