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A Moroccan Natural Solution for Treating Industrial Effluents: Evaluating the Effectiveness of Using Date Kernel Residues for Purification

Authors : Ahmed Salim, A. El Bouari, M. Tahiri, O. Tanane

Abstract : This research aims to develop and comprehensively characterize a cost-effective activated carbon derived from date residues, with a focus on optimizing its physicochemical properties to achieve superior performance in a variety of applications. The samples were synthesized via a chemical activation process utilizing phosphoric acid (H_3PO_4) as the activating agent. Activated carbon, produced through this method, functions as a vital adsorbent for the removal of contaminants, with a specific focus on methylene blue, from industrial wastewater. This study meticulously examined the influence of various parameters, including carbonization temperature and duration, on both the combustion properties and adsorption efficiency of the resultant material. Through extensive analysis, the optimal conditions for synthesizing the activated carbon were identified as a carbonization temperature of 600°C and a duration of 2 hours. The activated carbon synthesized under optimized conditions demonstrated an exceptional carbonization yield and methylene blue adsorption efficiency of 99.71%. The produced carbon was subsequently characterized using X-ray diffraction (XRD) analysis. Its effectiveness in the adsorption of methylene blue from contaminated water was then evaluated. A comprehensive assessment of the adsorption capacity was conducted by varying parameters such as carbon dosage, contact time, initial methylene blue concentration, and pH levels.

Keywords : environmental pollution, adsorbent, activated carbon, phosphoric acid, date Kernels, pollutants, adsorption
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