



## Characterization of activated carbon prepared from date palm fibers by physical activation for the removal of phenol from aqueous solutions

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### ABSTRACT

This study investigated the alternative cheap eco-friendly materials date palm (*Phoenix dactylifera*) fibers for the preparation of activated carbon (AC) by physical activation with CO<sub>2</sub> at different parameters of pyrolysis: pyrolysis temperature, the particle size and the duration of pyrolysis. The physical characterization (porosity and surface) was determined by the adsorption–desorption of nitrogen at 77 K (BET) and Dubinin–Radushkevich (D-R) equations, as well as the analysis by scanning electron microscopy. The chemical characterization (surface function), which was carried out by the Boehm titration, the pH zero-point charge (pH<sub>ZPC</sub>) and Fourier transform infrared spectroscopy, confirmed the acidic character of the material. The adsorption of phenol from aqueous solutions onto the prepared AC was investigated. The adsorption process followed the Langmuir isotherm model with a maximum adsorption capacity of 31.75 mg g<sup>-1</sup> for date palm fibers.

*Keywords:* AC of date palm fibers; Activated carbon; Physical activation; Adsorption; Isotherm; Phenol

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