

## CHARACTERIZATION AND ANALYSIS OF AN ACTIVATED CARBON ISSUED FROM THE CRYOGENIC GRINDING OF OLIVE STONES AND APPLICATION IN THE ADSORPTION OF BASIC DYE

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### Abstract

Adsorption using activate carbon (powdered or granular) is widely used for dye removal from wastewaters. However, it's very expensive because it need regeneration and reactive procedure. In this way our study is focused on characterisation, analysis and application of activated carbon issued from the cryogenic grinding of olive stones.

The first part concerns the determination of the characteristics of activated carbons obtained from the olive stones which were reduced to small grounds by using a cryogenic grinding with liquid nitrogen. Chemical activation of this precursor at 450 °C was adopted by using the phosphoric acid as dehydration agent at 2/1 impregnation ratio. FTIR was carried out to identify the surface groups. The microscopic structure and surface were examined by a SEM/EDX and BET respectively. Results showed surface area and pore volume approaching 1000 m<sup>2</sup>/g and 1 cm<sup>3</sup> respectively. The SEM imaging shows a microcrystalline structure and a highly developed porosity.

In the second part we investigate the feasibility of adsorption of Methylene Blue on the activated carbon prepared from olive stones. The stock solution was prepared by dissolving Methylene Blue in 1000 ml distilled water. The experiments were carried out at ambient temperature, with the initial concentration varying from 5–50 mg/l. The absorbance of dye solution was determined by a spectrophotometer at 665 nm wavelength. The amounts of dye adsorbed were calculated from the concentrations in solutions before and after adsorption.

Activated carbon issued from the cryogenic grinding of the olive stones seems to be a promising adsorbent for removal of the cationic dye Methylene Blue from water. Indeed, 5 g of adsorbent could almost completely decolorize solution of Methylene Blue (50 mg/l).

**Keywords:** Activated carbon, porosity, treatment, adsorption

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