

## Área: FIS

# Effect of KOH Ratio on Sugarcane Bagasse Activated Carbon

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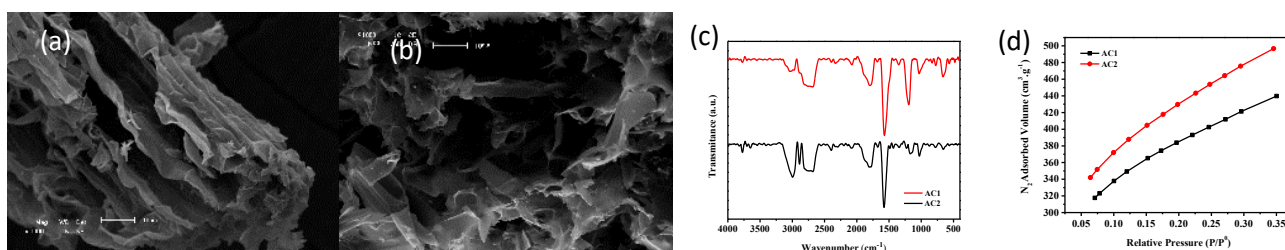
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### Highlights

- KOH-Activated carbon produced from the biomass of sugarcane bagasse

### Resumo/Abstract

Sugarcane bagasse was collected from sugarcane juice waste at a local fair, then dried and shredded. The material was carbonized in a furnace under a nitrogen atmosphere at a heating rate of 40 °C/min, reaching 500 °C, and maintained at this temperature for 1.5 h before cooling. The resulting carbon was then impregnated with KOH in 60 mL of water at two different ratios. In the first treatment, a 1:3 carbon-to-KOH ratio was used (3.0 g of carbon and 9 g of KOH), and in the second, a 1:4 ratio (3.0 g of carbon and 12 g of KOH). Each mixture was activated in the furnace under a nitrogen atmosphere at a heating rate of 20 °C/min up to 800 °C, with a holding time of 1.0 h. After activation, the carbons were washed with HCl and deionized water to remove residual chemicals. The figures below correspond to the activated carbons obtained at the 1:3 (AC1) and 1:4 (AC2) ratios. The SEM images show that both samples have irregular, rough surfaces with a porous, layered structure typical of activated carbons. The morphology suggests the formation of channels and cavities during the activation process, which contributes to the development of a porous texture suitable for adsorption applications. The FTIR spectra of AC1 and AC2 show typical bands of activated carbons. The broad peak near 3000 cm<sup>-1</sup> indicates O–H stretching, while the band around 1600 cm<sup>-1</sup> corresponds to C=C and/or C=O groups. Signals between 1400–1000 cm<sup>-1</sup> are related to C–O vibrations. AC2 displays weaker bands, suggesting a higher activation degree and removal of surface functionalities. The textural properties of AC1 showed specific surface area equals to 1400 m<sup>2</sup>/g, while AC2 demonstrated an increase to 1568 m<sup>2</sup>/g.



**Figure 1.** Characterization results: Microscopies for (a) AC1 and (b) AC2, (c) FTIR, (d) Isotherms.

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