

# Morphological, thermal stability and textural elucidation of raw and activated palm kernel shell and their potential use as environmental-friendly adsorbent

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## **ABSTRACT**

The use of environmental-friendly biomass as adsorbent is a critical discourse in the treatment of industrial wastewater. The need then arises for a controlled physicochemical preparation of this biomass into an activated carbon which can be used as potential adsorbents in wastewater treatment. In this study, the palm kernel shell (PKS) was prepared as activated carbon (AC). The raw and carbonised PKS were then characterized using different analytical techniques such as scanning electron microscopy (SEM), Fourier transforms infrared spectrometry (FTIR) and thermo-gravimetric analysis (TGA). The FTIR spectra confirmed the presence of various functional groups which include O-H, C-O, -NH-, and aromatics group. Additionally, the PKSAC shows larger irregular cavities and porosity which was generated from the forceful attack of the KOH(aq) during activation. The morphology of the carbonized PKS revealed the formation of well-developed pores which validated the potential of the activated carbon in the treatment of wastewater.

## **KEYWORDS**

Physicochemical; Palm kernel shell; Activated carbon; Industrial wastewater; Wastewater treatment; Adsorption

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