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ADSORPTIVE REMOVAL OF OIL USING *PARKIA SPECIOSA* HUSK

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Structured Abstract

Background: Oil spills pose a significant environmental challenge that requires effective cleanup solutions. In this context, this study investigates the potential of *Parkia Speciosa* husk as a biosorbent for oil spill cleanup. The study aims to address the pressing need for sustainable and efficient methods to clean up oil spills and minimize their adverse environmental effects by chemically modifying *Parkia Speciosa* husk to improve its hydrophobicity and adsorptive properties.

Methods: The material characterization was conducted to evaluate the effects of lauric acid modification on *Parkia Speciosa* husk. The hydrophobicity degree (HD) was measured to assess changes in water-repelling properties. Fourier Transform Infrared Spectroscopy (FTIR) was employed to analyze the chemical composition and to identify the presence of hydrophobic functional groups like CH_2 and CH_3. Besides, Scanning Electron Microscopy (SEM) was used to evaluate the surface morphology, focusing on changes in porosity and roughness to understand their impact on adsorption capacity. These techniques collectively provided insights into the modifications induced by lauric acid treatment, aiming to enhance the material's oil sorption capabilities and selectivity.

Results: This study shows that when Parkia Speciosa husk was treated with lauric acid, its ability to repel water increased by 17.6% due to the addition of hydrophobic groups like CH_2 and CH_3. The scanning electron microscopy (SEM) analysis showed that the surface porosity and roughness were improved, which is important for increasing the adsorption capacity. The modified *Parkia Speciosa* husk showed significant enhancements in its ability to absorb and retain oil, with a notable increase observed for both cooking oil and lubricant oil. Additionally, the material demonstrated an increased ability to separate oil from water, which emphasizes its effectiveness in this process.

Conclusion: In conclusion, the findings of this study emphasize the effectiveness of chemically modified *Parkia Speciosa* husk as a sustainable biosorbent for oil spill remediation. The notable enhancements in oil sorption capacity, retention, and selectivity, along with the material's renewable and biodegradable characteristics, establish it as a promising alternative for addressing the environmental impacts of oil spills.

Keywords: Hydrophobicity, Lauric Acid Modification, Oil Sorption, Oil-Water Separation, *Parkia Speciosa* husk.

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