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Extraction, Characterization, and Comparison of Properties of Cassava Bagasse and Black Seed Fibers

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Abstract:

The current study presents a nontoxic, and low-cost preparation of black seeds and cassava bagasse fibers. It also aims at investigating the physical, thermal, and morphological characteristics and chemical composition of these fibers. The current study's findings revealed significant differences in the properties in terms of chemical, morphological, physical, and thermal. The findings also showed that black seed fiber had a higher ash concentration (4.5%) compared to the cassava bagasse fiber of 0.4%. A density of 1.45 g/cm³ was observed for cassava bagasse fiber, while the black seed fiber exhibited a lower density of 1.22 g/cm³. From TGA results, only 21% of cassava bagasse and 38% of black seed fiber weight were observed for the highest degradation rates for both samples (200°C–500°C). In summary, this study suggests cassava bagasse and black seed fibers as promising feedstocks for biopolymers synthesis with an eco-friendly and cost-effective approach that may support the advancement of the biopolymer industry.