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Production of carbonized briquettes from charcoal fines using African Elemi (*Canarium Schweinfurthii*) resin as an organic binder

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Production of carbonized briquettes from charcoal fines using African Elemi (*Canarium Schweinfurthii*) resin as an organic binder

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Abstract

This study investigated the use of African Elemi (*Canarium Schweinfurthii*) resin as a binder for the production of carbonized briquettes from charcoal fines. The binder and charcoal fines were characterized through proximate analysis, ultimate analysis, higher heating value, and SEM. Four briquette samples (B25, B30, B35, and B40) with a ratio of charcoal fines: binder of 3:1, 7:3, 13:7, and 3:2, respectively, were produced at a compaction pressure of 5.92–7.96 MPa. The physical properties of the briquettes determined were bulk density, impact resistance index (IRI), compressive strength, splitting tensile strength, water resistance index (WRI), and morphology. The chemical properties of the briquettes determined were proximate analysis, ultimate analysis, higher heating value (HHV), and energy density. One-way ANOVA and Fisher's LSD were used to analyze the chemical properties of briquettes. The briquettes had a bulk density of 0.770–1.036 g/cm³, IRI of 2.90–73.33, compressive strength of 2.25–10.94 N/mm², splitting tensile strength of 0.09–0.42 N/mm², WRI of 99.26–99.29, and an HHV of 29.7–31.3 MJ/kg. The briquette properties were found to be comparable to results from other studies.

Keywords:

African Elemi resin; Briquette; Binder; Proximate analysis; Ultimate analysis