

Quality Improvement of Coconut Shell Charcoal Briquettes Using Hibiscus Leaf Adhesive Through Variations in Mixture Composition and Compaction Pressure.

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ABSTRACT

*The growing demand for sustainable energy sources has increased due to the continuous depletion of fossil fuel reserves. One promising alternative is the conversion of coconut shell biomass waste into biobriquettes using a natural adhesive extracted from waru (*Hibiscus tiliaceus*) leaves. This study investigated the effects of different coconut shell charcoal-to-adhesive ratios and compaction pressures on the characteristics of biobriquettes and evaluated their compliance with the Indonesian National Standard (SNI 01-6235-2000). The charcoal-to-adhesive ratios of 75:25, 70:30, and 65:35 were combined with compaction pressures of 1000, 750, and 500 psi. The evaluated parameters included moisture content, ash content, density, compressive strength, calorific value, and burning rate. Experimental data were analyzed using Analysis of Variance (ANOVA) with Minitab 22 software. The results showed that both the composition ratio and compaction pressure significantly influenced the biobriquette characteristics. Moisture content ranged from 4.89% to 7.55%, ash content from 2.51% to 3.55%, and density from 0.64 to 0.79 g/cm³, with all values meeting the requirements of SNI 01-6235-2000. The lowest moisture content was obtained at the 75:25 ratio with a compaction pressure of 1000 psi, the lowest ash content at the same ratio with 750 psi, while the highest density was achieved at the 70:30 ratio with 1000 psi. Overall, the combination of a 75:25 charcoal-to-adhesive ratio and a compaction pressure of 1000 psi was identified as the optimum treatment, producing high-quality biobriquettes with strong potential as an environmentally friendly alternative fuel.*

Keywords : *biochar briquettes, briquette characteristics, compaction pressure, composition variation, coconut shell charcoal, Hibiscus tiliaceus leaf adhesive.*