

***Optimization of Sugarcane Bagasse Briquette Production with
Cassava Peel Waste Binder Using the Taguchi Method***
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ABSTRACT

Sugarcane bagasse and cassava peel waste have the potential to be utilized as raw materials for charcoal briquettes. This study aimed to analyze the effect of variations in the composition of sugarcane bagasse and cassava peel binder, as well as charcoal particle size, on briquette characteristics and to determine the optimum treatment combination using the Taguchi method. The composition ratios used were 80%:20%, 75%:25%, and 70%:30%, with particle sizes of 40, 60, and 80 mesh. The tested parameters included calorific value, moisture content, ash content, density, bulk density, burning rate, and drop test. Data were analyzed using the Signal-to-Noise (S/N) ratio and Analysis of Variance (ANOVA). The results showed that the calorific value ranged from 3,895 to 4,975 cal/g, with the highest value obtained at the 80%:20% composition and 80-mesh particle size, although it did not meet the SNI 01-6235-2000 standard of 5,000 cal/g. Moisture content ranged from 6.060–12.688%, ash content from 6.198–8.690%, density from 0.7695–0.8492 g/cm³, bulk density from 0.2383–0.2638 g/cm³, burning rate from 0.0402–0.0524 g/s, and drop test values from 30.59–43.34%. Variations in composition and particle size affected briquette characteristics, with particle size having a more dominant influence than material composition. Taguchi optimization indicated that the best treatment combination was 80% sugarcane bagasse and 20% cassava peel binder with a 40-mesh particle size, resulting in a moisture content of 6.060%, ash content of 6.198%, and density of 0.7707 g/cm³, which met the SNI requirements. However, the calorific value of 4,788 cal/g remained below the required standard.

Keywords: *sugarcane bagasse, cassava peel, charcoal briquette, Taguchi method, biomass.*