

COMPARATIVE ANALYSES OF THE THERMAL PROPERTIES OF BIOMASS BRIQUETTE FUELS OF RICE HUSK AND GROUDNUT HUSK

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This work comprised the production, characterization and comparative analyses of biomass briquette fuels produced by blending major agricultural wastes such as rice husk and groundnut husk with coal dust. Different compositions of coal dust blended with rice husk and coal dust blended with groundnut husk briquettes were produced using starch as the binder while $\text{Ca}(\text{OH})_2$ served as the de-sulphurizing agent. The briquettes were produced mechanically using a manual briquetting machine with force and compression pressure of 276.36 N and 31.67 N/m² respectively. The ash content, volatile matter, fixed carbon, moisture content, compressive strength, ignition time, calorific value, water boiling test and burning time were carried out to determine the physical, mechanical and thermal properties of the briquettes. For coal dust/groundnut husk briquettes, the results showed that moisture content values were in the range 2.91-5.72%, compressive strength (7.97-10.78 N/mm³), ash content (24.21-27.60%), calorific value (22506.81-25898.18 kJ/kg), fixed carbon (26.63-48.81%), ignition time (21.19-38.32 s), water boiling test (2.15-4.94 min) and burning time (16.26-24.34 min). For the coal dust/rice husk briquettes, the moisture content results ranged from 3.37-6.95%, compressive strength (9.78-12.36 N/mm³), ash content (16.82-21.79%), calorific value (21739.54-25921.82 kJ/kg), fixed carbon (27.00-53.71%), ignition time (23.33-41.00 s), water boiling test (1.62-4.12 min) and burning time (16.17-24.15 min). From the result of the work, it could be seen that the briquette blends exhibited improved thermal properties against ordinary coal briquette fuel. Hence, the agricultural waste can be used as an alternative fuel source.

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