



## Density, Shatter index, and Combustion properties of briquettes produced from groundnut shells, rice husks and saw dust of *Daniellia oliveri*

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### ABSTRACT

*Objective:* This study investigated the potential use of sawdust of *Daniellia oliveri* (African Copaiba Balsam Tree), Rice husk and Groundnut shells to make briquettes for energy generation.

*Methodology and Result:* Doughnut shaped briquettes were produced from three biomass materials at 15%, 25%, and 35% level of starch binder in binary and tertiary combinations. Density, Shatter index and Combustion properties of the briquettes were investigated. The compressed density of *Daniellia oliveri* + Groundnut briquettes was highly significant ( $P < 0.01$ ) at  $2.32\text{g/cm}^3$ . The relaxed density was highly significant ( $P < 0.01$ ) among the biomass materials and binder levels. *Daniellia* + Groundnut briquettes recorded the highest relaxed density of  $2.46\text{g/cm}^3$  at 25% starch binder. *Daniellia* + Groundnut briquettes recorded the highest shatter resistance of 90.4. The specific heat of combustion of briquettes ranged from 4455.0Kcal/kg to 4734.0Kcal/kg.

*Conclusion and Application of Results:* The relative high heating values of the briquettes biomass materials indicate that they can be a very good alternative source of energy for domestic cooking. It is therefore recommended that sawdust of *Daniellia oliveri*, Rice husk and Groundnut shells that are usually discarded as waste in Nigeria could be converted to briquettes, which will serve as alternative source of energy for domestic cooking.