

SUSTAINABLE BIOMASS FUEL PRODUCTION: CARBONIZATION-BASED ENHANCEMENT OF RICE STRAW AND SUGARCANE BAGASSE BRIQUETTES

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Abstract

In this study, rice straw and sugarcane bagasse were carbonized at 500°C for 60 minutes to produce briquette charcoal. The physical and thermal characteristics of the resulting briquette charcoal were then examined regarding the type of biomass used. The results revealed that briquette charcoal produced from sugarcane bagasse exhibited superior physical and thermal characteristics compared to those made from rice straw. Particularly, the sugarcane bagasse briquette charcoal had a 43.33% lower water permeability and a 19.58 % higher heater value (HV) of 27.68 MJ/kg. The higher densification of the sugarcane bagasse briquette charcoal, which promoted better airflow during combustion and produced more complete and effective burning, was reflected in the lower water permeability. Furthermore, a higher energy yield ratio of 50.44 % demonstrated the carbonization process used to produce sugarcane bagasse briquette charcoal at 500°C for 60 minutes provided a higher energy conversion efficiency than that of rice straw. According to the investigations, sugarcane bagasse-derived briquette charcoal gave an improved fuel efficiency and was well suited for household energy applications.

Keyword: Briquetted charcoal, Sugarcane bagasse, Rice straw, Household applications.