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Utilisation of Jackfruit Waste for Briquettes and Biogas Production as Alternative Cooking Fuels

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Abstract

Naturally, more than 60 % of a ripe jackfruit is not eaten and is usually discarded as agricultural waste. This research explores the possibility of utilising this waste for production of briquettes and biogas as alternative renewable energy options for cooking. Proximate analysis, calorific value and compositional analyses were conducted. Carbonized briquettes were produced with jackfruit waste mixed with other selected agricultural wastes. Biogas was produced through anaerobic digestion using both laboratory experimental set up and underground fixed-dome digester. The results showed that jackfruit waste had a calorific values ranging from 15.77 to 17.54 MJ/kg which is comparable to other agricultural waste like rice husks and cotton. The briquette developed from jackfruit waste mixed with banana leaves in a ratio of 70:30 had a calorific value of 21.98 MJ/kg. The water boiling test showed that briquettes made from jackfruit waste mixed with banana leaves in the same ratio took 29 minutes to boil 2.5 liters of water. The starch content of jackfruit waste ranged between 29.05 to 59.54 % while the sugar content ranged from 2.04 to 68.8 %. Jackfruit waste when co-digested with 25 % cow dung produced the highest volume of biogas compared to other co-digestion mixtures. The methane content from jackfruit waste increased from 25.9 % to 69.6 % when the 25 % cow dung was added. Jackfruit waste can be utilised in the production of briquettes whose heating values are comparable to values of briquettes from other substrates. Jackfruit waste can also be utilised for production of biogas with more gas volumes expected when it is co-digested with cow dung in an appropriate mixing ratio.

† *Dedicated to the memory of author Noble Banadda, who passed away during the preparation of this Abstract.*

Keywords: Biogas, briquettes, calorific value, co-digestion., jackfruit waste