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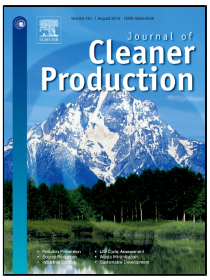

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Cleaner production in Burkina Faso: Case study of fuel briquettes made from cashew industry waste

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The use of biomass for energy production is one way to ensure energy security and address the environmental issues related to the use of fossil fuels in developing countries. Small and medium-sized enterprises (SMEs) need electric power and thermal energy for their activities. In Burkina Faso, this type of thermal energy is generally produced by SMEs from firewood. However, cashew companies produce a large amount of waste (shell, press cake, nut shell liquid) which can be converted into fuel. Separating the cashew nut from the shell requires two energy-intensive steps: roasting and drying. The energy is provided by cashew shells which are usually burned in boilers, but this method results in the production of anacardic acid and smoke both of which are irritating and which may be carcinogenic due to the presence of cashew nuts shell liquid (CNSL).

This paper describes the production of energy from cashew waste by making briquettes out of the press cake, which is left over after the removal of CNSL from the nut shell. The process consists in carbonizing the press cake at a temperature of 350 °C and grinding to a grain size of 0.5 mm. The resulting charcoal powder is then mixed with water and a binding agent (cassava starch), in this case cassava starch selected for its physical-chemical properties, availability in the local market, and its low price. The resulting mixture is then densified in a screw press to obtain briquettes 5.5 cm in diameter and 10 cm in length.

Several proportions of water and cassava starch were tested and the best briquettes were obtained with a mixture of 35% of water, 10% of cassava starch and 55% of press cake charcoal. The mechanical and physicochemical analysis of briquettes gave a net calorific value of 25.7 MJ/kg, a density of 0.91, a compressive strength index of 382.89 kPa and an impact resistance index of 61.10. A water boiling test performed afterwards showed that the combustion performance of the briquettes was the same as that of wood charcoal.

Keywords: Cashew industry, bioenergy, industrial waste management, briquettes, combustion.

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