

عنوان مقاله:

Physico-chemical, Calorific, and Emission Performance of Briquettes Produced from Maize Cob, Sugarcane Bagasse, and Polythene Composites

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خلاصه مقاله:

Global waste generation has been a challenging issue that vastly affects humans and the environment. The conversion of a vast amount of agricultural and polymeric waste to briquette may bridge the energy deficit and environmental pollution issues in developing economies. On the other hand, the utilization of biomass waste or residue as an energy source could help alleviate dependence on imported energy and its use continues to be a topical issue in both developing and developed countries. Over the years, biomass has been an important source of generating energy due to its relative availability and the ability to meet both heat and electricity demands by contributing towards international commitments so as to minimize environmental degradation and maximize environmental, social, and economic sustainability. The benefits of compacted biomass compared to all other types of biofuel include its low transportation and storage costs, uniform product quality such as constant humidity content, and high mass fluency. Moreover, fuel wood and biomass residues have low combustion efficiency, posing environmental and health hazards. This research studies the performance of briquettes produced from maize cob, sugarcane bagasse, and polythene waste composites. The briquettes were agglomerated using cassava starch binder (CSB) and plantain peel binder (PPB) at binder concentrations of ۴%, ۱۲%, and ۲۰%. Each briquette was characterized in terms of proximate analysis, calorific value, ultimate analysis and micro-structure by scanning electron microscopy. The briquettes had a moisture content of ۵.۳۹-۱۲.۱۰%, volatile matter of ۱۰.۱۵-۲۳.۰۸%, ash content of ۱۰.۲۹-۲۴.۶۳%, fixed carbon content of ۵۵.۸۴-۷۷.۱۰%, calorific value of ۹.۰۴-۲۸.۱۴ MJ/kg, carbon content of ۷۷%-۸۴.۵%, nitrogen content of ۰.۸۷۵-۱.۰۵%, and sulphur content of ۰.۴-۰.۷%. The results obtained from this study revealed that briquette produced using CSB at binder concentration of ۴% had the best properties required for biomass fuel briquette compared to .briquette produced using PPB and suggested its use for the production of environmentally friendly solid fuel

کلمات کلیدی:

Biomass waste conversion, Environmental pollution; Fuel Briquette, Waste management

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