

عنوان مقاله:

Effect of Pretreatment on the Physical Properties and Heating Values of Briquettes

محل انتشار:

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خلاصه مقاله:

Briquettes from agro-residues have been promoted as a better replacement to firewood and charcoals for heating and cooking in the rural communities. In view of this, a study was carried out to investigate the effect of pretreatment methods on physical properties and heating values of briquettes produced from corncob. To accomplish this work, the experiment was designed as a $۲ \times ۳ \times ۳ \times ۳$ completely randomized with three replicates. The parameters are pretreatment methods (carbonized and uncarbonized), binder types (cassava, corn and gelatine), binder concentrations (۱۰, ۲۰, ۳۰%) and compacting pressure (۵۰, ۱۰۰ and ۱۵۰ kPa). A charcoal kiln was fabricated to obtain the pretreatment through pyrolysis and a punch and die was also fabricated to enable the briquette densification. The physical properties tested were limited to moisture content (MC), density and compressive strength and were determined using a conventional method. The heating value of the briquettes produced was determined using bomb calorimeter. The results showed that average moisture content ranged between ۵.۲۹-۶.۵۸% and ۱۲.۷۵-۱۳.۷۲%, mean relaxed density varied from ۸۱۳-۹۲۵ $\text{kgm}^{-۳}$ and ۹۶۳-۱۱۶۶ $\text{kgm}^{-۳}$, compressive strength ranged between ۲.۲۷-۵.۰۷ MPa and ۵.۹۷-۱۰.۱۲ MPa and heating value ranged between ۲۸.۸۵-۳۲.۳۶ $\text{MJkg}^{-۱}$ and ۲۷.۵۸-۲۸.۸۰ $\text{MJkg}^{-۱}$ for carbonized and uncarbonized briquettes, respectively. Briquettes produced from carbonized corncob had a better moisture content and heating value, while briquettes produced from uncarbonized corncob had higher density and compressive strength. The study shows that pretreatment methods under different binder types and concentrations and the compacting pressure significantly affected briquette's physical properties and heating values.

کلمات کلیدی:

carbonized briquette, uncarbonized briquette, Density, Compressive strength, heating value

