ABSTRACT

Many household needs, transportation, electricity generation, and others need fuel a driving energy source. Human dependence on fuel, especially fossil fuels, is inverse proportionally to its availability. In order to meet increasing energy needs, the development of alternative energy sources continues to be encouraged to reduce consumption of fossil fuels. As a country located in the tropical region, Indonesia is one of the largest coconut producers in the world. Seeing that most coconut shell waste has not been fully utilized, it is necessary to make efforts to process coconut shell waste into charcoal briquettes as one of the alternative fuels to replace fossil energy.

This study examines the effect of variations of briquette pressure of coconut shell charcoal briquettes with starch adhesive using the thermogravimetric analysis (TGA) method, and proximate analysis. The raw material from coconut shell has been prepared with a final temperature of 500^{o}C; then the charcoal is crushed using a blender until it gets 20 mesh in size, then weighs 3 grams each, and mixed with adhesive ingredients in the form of starch with a composition of 10%. Charcoal powder that has been mixed with adhesives then makes it into briquette at a pressure of 350 kg/cm^2, 400 kg/cm^2, and 450 kg/cm, with a solid cylinder briquette and uniform in size.

The results of testing the characteristics using the thermogravimetric analysis (TGA) method showed that the higher the pressure of coconut shell bio-briquette it will affect the combustion characteristic which includes: the increase of the value of combustion time, ITFC, PT, and Activation Energy, and the decreases in ITVM and BT values. From the results of the proximate analysis, the higher the pressure of the coconut shell bio-briquette, the higher the value of volatile matter and ash content and the lower the value of the water content and the level of fixed carbon. The result of testing the calorific value shows that the higher the briquetting pressure, the higher the density of a briquette so that it will reduce the water content of coconut shell bio-briquettes. The lower the water content will make it easier for the briquette ignition process and will produce higher calorific values.

Keywords: Energy, Briquetting, Biomass, Proximate, Coconut Shell, Thermogravimetric analysis (TGA).