

ABSTRACT

The dependency from society on fossil fuels makes fossil energy increasingly limited, for example by using kerosene and gas fuels. Therefore, other alternative energy is needed, one of them is by utilizing alternative energy from biomass which can be applied to gasification stove. Gasification is the process of changing solid fuels in the form of biomass into gas. In this research, using updraft of type gasification stove with gasifier height 40 cm and diameter 10 cm. The use of the gasification stove is to see the effect of variations in air flow (1 m/s, 2 m/s, 3 m/s, and 4 m/s), with five variations of air holes in the gasifier, namely 30 air holes, 50 air holes, 70 air holes, 90 air holes and 110 air holes. In addition, updraft gasification stoves were carried out using the Indonesian National Standard (SNI) method for biomass stoves and examination was carried out using mahogany wood pellets and corn cobs. The test were also carried out using 0.5 kg of fuel each and two liters of boiled water. The results of updraft type biomass gasification stoves fueled with mahogany wood pellets were obtained by thermal testing, namely 20.33% at a variation of 90 air holes with an air rate of 4 m/s. In the mean time, the test results using corn cobs fuel obtained thermally is 19.32% at a variation of 90 air holes with an air rate of 4 m/s. The test results of the biomass gasification stove produced a reddish yellow flame with the percentage of colors in each experiment above is 90% red. The examination with mahogany wood pellet fuel resulted in the highest gasifier temperature of 749.67 °C at 110 air holes at 4 m/s. Meanwhile, with corn cobs the highest gasifier temperature is 710.42 °C at 90 holes at 4 m/s. Temperature below 1000 °C means that the fire tends to be red.

Key Words: Biomass, Corncob, Indonesian Nasional Standart, Updraft Gasification Stove, Wood Pellet.