

ABSTRACT

Biomass gasification stoves are one of the alternative technologies of energy conversion techniques that can convert biomass into energy sources. But the stove is now still have problems with the color of the flame is still red and the operation time is not long. Therefore, this research is designed with biomass gasification stove using downdraft type with wood pellet fuel. In this study, tested two reactors that have a different height of gasifier is 25 cm and 20 cm. Each reactor is given eight variables of AFR, i.e. 1.57; 1.68; 1.78; 2.1; 2.4; 2.7; 2.8; and 2.9. Testing of the downdraft type gasification stove with a variation of AFR and altitude of the gasifier is expected to improve the performance of the biomass gasification stove with data retrieval methods using the SNI furnace biomass 7926:2013 procedure. From the testing of biomass gasification that has been done, it was obtained that the operation time of the stove longest 37 minutes in variations of AFR 2.4 with height gasifier 25 cm while the highest thermal efficiency value is found in the variation of AFR 1.78 with a height of 20 cm gasifier is 15.56% and on AFR 2.1 with a height of 25 cm gasifier obtained the greatest intensity of the blue flame color is 101,12. The average of the performance of the stove is getting better if approaches the value of stoichiometry and lower the height of gasifier then thermal efficiency, flame temperature, heat rate will be higher.

Keyword: Biomass gasification stoves; *downdraft*; *wood pellet*; *AFR*