

## **ABSTRACT**

### **THE FABRICATION AND TESTING OF BIOMASS STOVE WITH GASIFICATION PRINCIPAL**

By

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Biomass is a promising fuel as a source of renewable energy, procurement of biomass is easy to do since most of biomass is around living environments. The use of biomass at cooking process using traditional stoves has a low efficiency. The objectives of this research is to make and test an efficient biomass gasification stove. Through this research was expect to be generated biomass stoves efficient.

The experiment was conducted according to standard of boiling test from Baldwin. Water was boiled with three types of biomass, namely wood, wood shavings, and rice husk. Five liters of water was used in all experiments which were replicated three times. Parameters to be observed included fuel consumption, boiling time, power of the stove, and thermal efficiency.

Biomass gasification stove was constructed from 1-mm zinc plate and had a dimension of 54 cm of height and 31 cm of diameter with combustion chamber capacity 5,89 liters of. The results showed that the stove was not working using rice husks due to no sufficient air flow through the rice husks pilling. The stove was working good using either woodfuel or wood shavings. The average time to boil 5 liters of water using woodfuel and wood shavings was 14,19 minutes and 21,90 minutes, respectively. Fuel consumption to boil 5 liters of water was 689,5 g using woodfuel and 619,7 g using wood shavings. The input and output power of the stove was respectively 12,12 kW and 2,65 kW with woodfuel. With wood shavings, the input and power of the stove was 8,24 kW and 1,64 kW, respectively. The gasification stove had thermal efficiency of 19,93% with wood shavings and 21,90% with woodfuel. It was better than thermal efficiency of a common traditional wood stove, which had thermal efficiency of 15,49%.

*Keywords: biomass, gasification stove, thermal efficiency, boiling time, power.*