

# CHAPTER I

## INTRODUCTION

### 1.1. Background

Currently energy needs is one source of human life that can not be separated. Energy can be classified into two: energy that comes from fossils of living things and plants. In this study, researchers focused on energy sourced from plants called biomass. Biomass is often referred to as bioresource. The biomass resource base includes Biogas, Plants, Agricultural Waste, Energy Plants, and others. Biomass resources can be renewed so that biomass energy is a renewable energy.

In ancient times, the use of biomass has been used since early humans discovered fire until in 1970, and in 1975 scientists named the fossil fuel other than the name of biomass. Emerging new technologies regarding the utilization of the biomass. One such technology is the process of gasification.

Based on fluidization mode gasification can be divided into four, there are fixed gasification gasification, moving bed gasification, fluidized bed gasification and entrained bed gasification.

Based on the flow direction, gasification can be divided into three, there are downdraft gasification, updraft gasification, and cross draft gasification. Gasification process with updraft gasification method can produce fewer emission which can endanger human health. At this time

has been a lot of application of updraft gasification method on cooking stove gasification with various designs. This is done to get the best results from cooking stove gasification.

Fuel for cooking stove gasification rice husks updraft gasification method can vary. One of the fuels that can be used is rice husk. Rice husk is often interpreted as waste material from rice mill, its existence tends to increase which experienced natural and slow destruction process, so it can disturb environment also human health. Rice husk has a bulk density of 125 kg / m, with a calorific value of 1 kg rice husk of 3300 k.calory and in terms of chemical composition, carbon husk (charcoal) 1.33%, 1.54% hydrogen, oxygen 33,645, and Silica (SiO<sub>2</sub>) 16,98%, which means husk can be utilized as raw material of chemical industry and as source of heat energy for human need.

The variation in primary airof the gasification stove reactor is improvisation of cooker cooking design of rice husk gasification updraft method used in this research. It aims to obtain the best performance of cooking stove gasification rice husk updraft method used. Therefore, in this study, researchers need to make measurements of flame temperature, recording time of flame and thermal efficiency generated on the stove used..

## **1.2. Problem Statement**

Based on the description above, can be formulated problems in this study as follows.

1. How does the variation of primary airflow velocity affect the reactor to the flame temperature on gasification stoves?
2. How does the variation of primary airflow velocity affect the reactor to the time of the flame on the gasification stove?
3. How does the variation of primary airflow velocity affect the reactor to the thermal efficiency generated on the gasification stove?

## **1.3. Problem Limitation**

Analyzing the existing problems required some limits to the discussion more concentrated on the issues to be studied.

Limitations of the problem taken are as follows.

1. The fuel used is rice husk with 1 kg mass and Original mesh;
2. The stove used is updraft gasification stove with primary air variation;
3. The insulating material used is refractory clay;
4. Variations in primary air flow velocities are 4, 5, and 6 m/s;
5. The environment is at 1 atm pressure;
6. The value taken in this study is the temperature of the flame, the time of the flame and the resulting thermal efficiency;

7. This study does not discuss the stoichiometry of fuel combustion with air and the type of stream entering the reactor;
8. In this study does not discuss the calculation and movement of conduction heat transfer, convection, and radiation.
9. In this study does not discuss the type of gas that can burn and cannot burn.

#### **1.4. Objective Of Study**

Referring to the background and formulation of the problem, then the purpose of this study is:

1. To describe the effect of variation of air velocity of primary air to flame temperature on gasification stove by updraft method;
2. To describe the effect of primary air velocity variation on flame time on gasification stove by updraft method;
3. To describe the effect of primary airflow velocity variation on the thermal efficiency generated on the gasification stove by updraft method.

#### **1.5. Outcome**

The Outcome of this research are:

1. For science, can be a reference knowledge about the influence of air variations on updraft gasification stove technology;

2. For the community, it can provide knowledge and benefits of rice husk that is used as a cheap and efficient alternative fuel;
3. For the nation and country, can participate in overcoming problems of domestic energy fulfillment and the development of affordable alternative energy technologies.

### **1.6. Research Method**

The method of this research is as followed:

- a. Literature study is finding references about the research that covers many sources such as books, journal or website.
- b. Planning and is preparing material and tools in helping the research process.
- c. Experiment is examining coping husk with gasification furnace and record the result of combustion temperature and combustion time.

### **1.7. Writing Structure**

#### **CHAPTER I INTRODUCTION**

This chapter consists of background, problem formulation, problem limitation, research objectives, research benefits, and systematic writing.

## **CHAPTER II LITERATURE REVIEW**

This chapter consists of literature review of previous research and theoretical basis derived from the books and journals used as the guidelines in this study.

## **CHAPTER III RESEARCH METHODOLOGY**

This chapter consists of research flow diagrams, research tools and materials, the installation of experimental tools and test steps on the updraft gasification stove method.

## **CHAPTER IV RESULT AND DISCUSSION**

This chapter contains flame temperature data every 30 seconds, flame time and thermal efficiency generated.

## **CHAPTER V CONCLUSIONS AND SUGGESTIONS**

This chapter contains the authors' conclusions and suggestions.

## **REFERENCES**

Contains a list of books, scientific journals and other sources used as a reference in the writing of the final report.

## **ATTACHMENT**

Contains about the attachments related to gasification stove updraft method research.