

# CHAPTER I

## INTRODUCTION

### 1.1 Background of The Study

Red rice is usually favored by people who wants a healthier lifestyle since it contains a lot of fiber and antioxidants. However, red rice that is widely marketed has a low protein content. Same as red rice, white rice analog that is familiar to the public also has low protein content and doesn't have antioxidants. Whereas in this product, the color and antioxidants comes from the addition of dragon fruit peel and purple tuber flour. The advantage of this red rice analog is having higher protein than other red rice, this is due to the addition of soybean flour which is rich in protein. This makes red rice analog superior to white rice analog or plain red rice. Just like white rice analog, this product uses porang tubers which have a high fiber content and a rice-like texture.

Porang (*Amorphophallus muelleri blume*) is a perennial tuberous herb belonging to the *Araceae* family. *A. muelleri* tuber is rich in glucomannan (up to 70%), which is a polysaccharide with many industrial uses and health benefits. This property makes porang tuber a valuable commodity. Porang tubers are popular plant in Indonesia these days. The cultivation of porang has garnered attention in recent years, especially in Central Java and on the island of Java. To grow porang into an export good, the government also gives it a lot of attention (DPRD-Jateng, 2020; Pemprov Jateng, 2020; Pertanian-Jateng, 2020). Porang tubers are in high demand due to their high glucomannan content, particularly in the food and health sectors of both domestic and international trade (Wigoeno et al., 2013). Shi et al (2020) stated that glucomannan is a hydrophilic polysaccharide that can be derived from a variety of naturally occurring plants. In addition to porang tubers, purple sweet potatoes are also used as the main ingredient for making this product due to their color and antioxidant content.

Purple sweet potatoes (*Ipomoea batatas L.*) is extensively grown in temperate, tropical, and subtropical climates (Shekhar et al., 2015). Due to its great yielding potential and strong tolerance to a various type of environmental, soil, and temperature conditions, purple sweet potatoes are regarded as one of the most promising economic crops (Ahn et al., 2010; Sun et al., 2014). According to Lee et al. (2012), sweet potatoes are currently ranked as the seventh most significant food crop worldwide. It is a highly nutritious vegetable, containing a variety of vitamins, amino acids, minerals, dietary fiber, phenolic acids, anthocyanins, tocopherol and beta-carotene etc (He et al., 2012; Teow et al., 2007; Wu et al., 2008; Zhang et al., 2014). Anthocyanin is a color pigment that becomes a natural colorant in the production of red rice analog. Another advantage of purple sweet potatoes are also because they contain antioxidants, antimicrobial, anticancer, and anti-inflammatory. Since sweet purple tubbers have a low protein content, to increase the protein nutrient content in red rice analog products, soybean powder is added.

Soybean (*Glycine max (L.) Merr.*) is a native crop of China and one of the oldest oilseed crops in the world. Data from the Food and Agricultural Organization show that 276.406.003 tons of soybeans are produced globally through cultivation. Soybean constitutes one of the largest sources of vegetable oil and of animal protein feed in the world. It has the highest protein content (40–42%) of all other food crops and is second only to groundnut with respect to the oil content (18–22%) among food legumes (Sugiyama et al., 2015). Soybean proteins represent a major source of amino acids. Soybean proteins are also a good source of various bioactive peptides and have unique health benefits, which are used for the prevention of age-related chronic disorders, such as cardiovascular disease, obesity, impaired immune function, and cancer. With the addition of soybeans the protein content in red rice analog is higher than the regular red rice, and antioxidants from dragon fruit peel are added so that the antioxidants in this product are also superior compared to regular red rice.

Dragon fruit (*Hylocereus polyrhizus*) is emerging in health promotion products in addition to its known application in food having nutritional and decorative effects. The dragon fruit peel has potential as a natural colorant (Harivaindaran et al., 2008), an antibacterial against nine bacteria of food pathogen (Nurmahani et al., 2012), and natural antioxidant (Luo et al., 2014). Dragon fruit peel in this product is not only as a coloring agent but also source of antioxidant by utilizing food waste.

Dehydrating is a crucial step in the food industry's preservation of goods and raw ingredients. Drying is a process in which water is removed to halt or slow down the growth of spoilage microorganisms as well as the occurrence of chemical reactions (Canovas, 1999). Another crucial method in the production of this red rice analog is through steaming.

Using water vapor to cook food is the wet cooking method known as steaming. Usually, steaming equipment is multilevel and has a steam path made of a perforated base. The ingredients' inherent flavor and color are preserved by this method.

## **1.2 The Objectives of The Study**

The purpose of the study are:

1. To create red rice analog product that is rich in fiber, antioxidants, and proteins.
2. To show that food waste in the form of dragon fruit peel can be utilized as a natural coloring material that contains nutrition such as antioxidants.