CHAPTER 1: INTRODUCTION

1.1 Project Background

Food loss is the biggest challenge in the agriculture sector. Based on the FAO (2011), the wd, including postharvest processing, distribution, and consumption of the product. In 2016, Indonesia became the country with second largest food waste (Bisara, 2016). In developing countries like Indonesia, losses in agricultural production are dominating the total losses. Severe food losses also happened during post-harvest and distribution stages, which can be caused by deterioration of perishable crops within the humid and warm climate in Indonesia and other developing countries, as well as by seasonality that leads to abundance of unsaleable fruits or vegetables. Thus, post-harvest treatment or processing must be done to preserve the shelf life and the quality of the crops.

Drying is one of the simplest and oldest methods of food preservation which is still commonly used nowadays. The main principle of the drying process is by removing the water molecules from the food matrix by applying heat in order to inhibit the growth of the microorganism (FAO-AGS, 2007). This method also significantly reduces the weight and bulk of food which leads to lower the transport and storage cost. In order to maintain the quality of the fruits, it is critical to control the temperature during the process. Thus, artificial dryers such as food dehydrators, ovens, bed dryers, spray dryers, and freeze dryers are preferable compared to the sun drying method.

Breadfruit (*Artocarpus altilis)* is considered as a staple food that grows in most areas of the world, with the Caribbean islands and the Pacific being the major producers (Janick & Paull, 2008). Most of the breadfruit types can be harvested throughout the year. Both ripe and unripe fruits can be processed into many kinds of food products. However, this fruit is normally consumed when mature, starchy, and firm. For unripe breadfruit, it is usually cooked before consumption. The fruit can be roasted, baked, fried or boiled prior to consumption. This fruit is an important staple food for its high fiber and carbohydrate content; breadfruit contains 4.0, 31.9, and 16.8 grams of protein, carbohydrate, and calcium respectively in each 100 grams serving which is higher than white potatoes and white rice (Ragone, 2014). This fruit is also a good source of magnesium, thiamine (B1), niacin (B3), potassium, phosphorus, and contains some carotenoids.

Even though it is very nutritious, breadfruit preservation is still a problem. This fruit contains a very high water content (71%), making it to become highly perishable (USDA, 2019). One tree can bear up to 160-500 kg of breadfruits every year (Ragone, 2018). Huge quantities of breadfruits are produced at some points of the year. These circumstances result in an immense food loss; further post-harvest treatment or processing is required to reduce this issue. One of the possible solutions to increase the value and reduce the food loss of breadfruits is via the drying process. Therefore, by utilizing the drying process, it is hypothesized that samples treated with higher temperature will have significant difference of moisture content, weight loss, weight loss rates per hour, water activity, water activity decreasing rate per hour, and the shelf life of breadfruit can be prolonged up to 10 days and thus reducing food loss.

1.2 Objectives

The objective of this research is to compare the effect of different temperatures using conventional drying towards the physicochemical properties of breadfruits (*Artocarpus altilis*). Furthermore, the effect of conventional drying will be investigated on breadfruit quality throughout the 10 days storage period.

1.3 Scope of Work

In this experiment, conventional drying as postharvest treatments will be applied to breadfruit. Furthermore, the difference between pre-treated and controlled samples will be observed. Ascorbic acid solution will be applied as an anti-browning agent for the pre-treated samples. All of the samples are then dried at three different temperatures for 7 hours. During the drying process, physicochemical properties of the breadfruit such as weight loss, weight loss rate, water activity, water activity rate, water content, and water activity after 10 days of storage will be analyzed. It is expected that the conventional drying for breadfruit will maintain the overall quality of breadfruit as well as prolonging the shelf life for at least 10 days.

1.4 Importance of the Research

This study is conducted in order to obtain methods or techniques to enhance the handling of breadfruits after harvesting. The results may help dried breadfruit manufacturers in the future, in which they can estimate the time and temperature to reach their target moisture content, water activity, or weight loss. The final results are expected to improve breadfruit utilization and reduce food loss in the agricultural sector.