

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Jackfruit (*Artocarpus heterophyllus*) is one of the tropical fruit commodities widely cultivated in Indonesia. Until now, the utilization of jackfruit has mostly focused on its flesh. Meanwhile, the seeds are often discarded and considered waste. In fact, jackfruit seeds have a good nutritional profile and can be processed into various products. They are an excellent source of protein and carbohydrates, as well as phytonutrients such as lignans, isoflavones, and saponins, which offer numerous health benefits including antioxidant, anti-cancer, and anti-aging properties (Dhani et al., 2025a).

In Indonesia, the utilization of jackfruit seeds in the food sector remains very low. This is mainly due to the lack of interest in processing jackfruit seeds (Makmur et al., 2022). According to the Central Bureau of Statistics BPS (2021), the production of jackfruit reached 906,514 tons in 2021. A single large jackfruit can contain between 100 to 500 seeds, with each seed weighing approximately 3 to 9 grams (Sandra Maleachi et al., 2022). Given the vast production potential, it is unfortunate that jackfruit seeds are often treated as waste. Therefore, utilizing jackfruit seeds is both important and urgent to reduce organic waste and increase the added value of jackfruit as a whole.

This supports the development of products that make use of jackfruit seeds. Granola has been chosen as an innovative product because it is already well-known as a practical, healthy food source that is easy to consume. A granola bar is a food item made from dry ingredients such as oats, seeds, nuts, or dried fruits, mixed with a binder like honey and pressed into bar-shaped pieces. This food is widely accepted by consumers as a nutritious snack or convenient meal due to its balanced nutritional value (da Silva et al., 2016; Fidha Surya Novila Garini, 2023). Additionally, the rising

trend of healthy food consumption presents an opportunity to develop granola bars using high-nutrient local ingredients such as jackfruit seeds, which have yet to be optimally utilized (Fang et al., 2023).

Several studies have also demonstrated the potential of jackfruit seeds as a functional food ingredient. Jackfruit seed flour has been shown to have higher nutritional content compared to rice, wheat, and corn flour, making it a suitable alternative raw material for processed food products (Arefin et al., 2022). Another study on biscuits made from 100% jackfruit seed flour revealed that the product was well accepted in terms of sensory attributes and contained relatively high levels of carbohydrates, fiber, and protein (Kaushalya & Wijesinghe, 2024).

In food product development, texture and nutritional value are crucial factors that determine product quality and appeal. To improve texture while enhancing product value, the addition of supporting ingredients with specific characteristics is often necessary (Andersen et al., 2019; Cao & Yan, 2021). One such ingredient that can be utilized is rice puff, which is rice processed through a heating (puffing) method to produce a crispy and light texture. The expansion of rice puff is highly influenced by the amylose content in the rice, where a higher amylose content can result in more optimal expansion (Saha & Roy, 2022).

In addition to rice puff, another ingredient that can be used is oats. Oats are known as a functional food ingredient rich in nutrients, including dietary fiber (particularly beta-glucan), protein, B-complex vitamins, and minerals such as magnesium and phosphorus. The diverse nutritional content of oats containing more than 50 types of nutrients provides various health benefits, such as lowering cholesterol, maintaining digestive health, and promoting a longer lasting feeling of fullness (Sava & Imawan, 2022a).

This product also contains food additives in small amounts that play an important role, such as peanuts and sunflower seeds. The inclusion of peanuts is a strategic choice as they provide a distinctive texture and flavor while offering nutritional benefits. Peanuts are rich in plant-based protein,

healthy fats (unsaturated fatty acids), vitamin E, magnesium, zinc, and fiber that supports digestive health. Moreover, antioxidants like resveratrol contribute to heart health by reducing the risk of atherosclerosis and cardiovascular diseases (Adam Indra Nirwana et al., 2022). Sunflower seeds are also a valuable addition, being a natural source of nutrients with numerous health benefits. They contain heart-healthy unsaturated fats, protein, fiber, and various minerals such as selenium, copper, magnesium, and iron. In addition, they are high in vitamin E, a powerful antioxidant that helps fight free radicals and prevent inflammatory diseases such as arthritis, asthma, and diabetes (Puraikalan & Scott, 2023).

Given the many benefits of jackfruit seeds, this study aims to develop a granola bar product made from jackfruit seeds. It is expected that this effort will lead to the creation of an alternative food product and promote the sustainable use of agricultural waste.

1.2 Objective of Study

The objectives of this study are following bellow:

1. To utilize jackfruit seeds, which are often considered food waste, by turning them into nutritious granola products that are consumable and economically valuable.
2. To analyze the nutritional content of jackfruit seeds in granola products as a potential healthy functional food.
3. To determine the optimal formulation in the production of jackfruit seed granola.