

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Ingredients Review**

##### **2.1.1 Kepok Banana Flour**

Banana (*Musa paradisiaca*) is a horticultural product originating from Southeast Asia, especially Indonesia, which is a herbaceous fruit plant (Sijabat & Komariah, 2022). Bananas are a very popular fruit in Indonesian society because they are often consumed without knowing social strata. Indonesia is also the largest producer of bananas in Asia and every year production continues to increase (Anisa et al., 2020). Kepok bananas are a local food source that can be said to be quite prospective (Kaputri, 2017) because cultivating banana plants is easy, they can be harvested regardless of the season so that the banana harvest continues throughout the year. Apart from that, banana plants can grow in any land conditions (Y. Saputra, 2020).

How to consume bananas can be done directly or processed into a product. The contents of bananas include carbohydrates, protein, fat, B vitamins (thiamine, riboflavin, ascorbic acid), and minerals (potassium, chlorine, sodium, magnesium, phosphorus). Bananas can experience a decline in quality in a fairly short time. Therefore, diversification of processing of bananas is carried out to increase the shelf life and usability of bananas, one of which is by processing them into flour (Sijabat & Komariah, 2022). The following is the composition of the nutritional content in 100 grams of kepok banana:

**Table 2.1** Composition of the Nutritional Content in 100 Grams of Kepok Banana

Nutrients	Kepok
Energy (Cal)	115
Proteins (g)	1.2
Fat (g)	0.4
Carbohydrate (g)	26.8
Calcium (mg)	11
Phosphor (mg)	42
Iron (mg)	1.2
Vitamin A (RE)	0
Vitamin B (mg)	0.10
Vitamin C (mg)	2.0
Water (g)	70.7
Edible part (%)	62

Source: Aliyi, 2020



**Figure 2.1** Kepok Banana Flour

The good quality of banana flour is largely determined by the maturity level of the harvest. The bananas used to be processed into flour are kepok bananas whose skin color is still green (Desiliani et al., 2019). Bananas that are good for making banana flour are bananas that are harvested at 80 days after flowering (20% starch and 0.5% sugar). This is because under these conditions the formation of carbohydrates has reached a maximum, and most of the tannins have broken down into aromatic ester compounds and phenols, resulting in a balanced sour and sweet taste. If the bananas used are too ripe, the resulting flour yield will be low and liquid will form during drying. This is because the

carbohydrates have been hydrolyzed into simple sugars so that the carbohydrate content decreases. If the bananas used are too young, it will produce banana flour which has a slightly bitter and astringent taste because the tannin content is quite high while the carbohydrate content is still too low (Khodijah et al., 2024).

Banana flour contains several ingredients such as carbohydrates, fat, protein, vitamin C and fiber (Rosalina et al., 2018). Banana flour has advantages over wheat flour because banana flour contains higher levels of starch, fiber and potassium (Sijabat & Komariah, 2022). The starch content in Kepok banana flour is 65.71% higher than the starch content in wheat flour which is 58.92% (Khodijah et al., 2024). First, the kepok bananas are sorted. The bananas are steamed to reduce the sap. Next, the banana skins are peeled and the banana flesh is sliced. The banana slices are placed and arranged on a baking sheet then baked in the oven. After that, the dried bananas are ground into flour (Desiliani et al., 2019). The following is the composition of the nutritional content in 100 grams of banana flour:

**Table 2.2** Composition of the Nutritional Content in 100 Grams of Banana Flour

Nutrient Content	Amount
Calories	338 kCal
Water	13,80 g
Proteins	2,90 g
Fat	0,40 g
Carbohydrate	80,60 g
Fiber	5,30 g
Potassium	734 mg
Calcium	23 mg
Phosphor	62 mg
Iron	4 mg

Source: NilaiGizi.com (2018)

### 2.1.2 Butter

As the population increases and the food industry grows, the demand for butter will also increase as a complement to human food needs (Amen et al., 2020). Butter is milk fat which is produced from the proper separation of other components through a churning process, namely the process of breaking up an oil-in-water emulsion. Butter is a water-in-oil emulsion with approx 18% water is dispersed in 80% fat with a small amount of protein which acts as an emulsifying agent (Safitri et al., 2023).



**Figure 2.2** Butter

The presence of Beta carotene dye in cream can give it a yellow color (Safitri et al., 2023). The use of emulsifying agents such as fat derivative compounds in the form of monoglycerides or diglycerides can mix the butter mixture well and evenly (Amen et al., 2020). Butter has nutritional content that depends on the fat content and fat-soluble vitamins. Butter can be said to be a food source of high energy (7-8 calories/g), low protein, and does not contain lactose and minerals (Safitri et al., 2023).

Butter is fat from animal milk which contains palmitic, oleic and stearic acids, small amounts of butyric acid, and other types of fatty acids. Apart from that, other ingredients contained in small amounts are vitamin A, vitamin E, vitamin D, and flavors in the form of diacetyl, lactone, butyrate and lactan. Butter is an important component in making cookies. The butter content in cookie dough is one of the factors that contributes to the variety of different types of cookies. In

the dough, butter provides a shortening function and a texture function so that the cookies become softer. Apart from that, butter also functions as a flavor enhancer. When the butter coats the flour, the tissue is broken so that the characteristics of the meal after baking become less hard and melt more quickly in the mouth. Use butter as much as 65 – 75% of the amount of flour. This percentage will produce cookies that are crumbly, dry and tasty. Use too much butter, the cookies will spread out and break easily, while too little butter will result in cookies with a hard texture and a sticky taste in your mouth. Even though the price of butter is not very cheap, using butter can produce a premium product (Nixon & Rinayanthi, 2023).

### **2.1.3 Dextrose Monohydrate**

Dextrose monohydrate is a hydrated form of glucose. Glucose is a type of simple sugar that is the main energy source for the human body and many other organisms. Dextrose is sourced from starch and is corn-based. Even though it comes from natural sources, adding dextrose to food or beverage products can be used as additional sugar. It has about 20% less sweetness compared to sucrose. This is because basically dextrose is glucose, while sucrose is 50% glucose and 50% fructose (Ingredi, 2019). This sugar has the special feature of tasting cool in the mouth because it contains mint and will not get wet if it comes into contact with oil (Martiyana, 2022). Dextrose is a multi-purpose sweetener that can be used for most food, beverage and industrial applications. This type of sugar is used for making cakes, cookies, fillings, glazes, icing, and rolls. Apart from that, it can also be used in making energy drinks and other drinks to provide a softer sweet taste with fewer calories than granulated sugar (Ingredi, 2019). When making snow white cookies, this sugar functions as a topping and coating, and can provide a sweet taste. This sugar also gives it an appearance that resembles snow, which lives up to the name "snow white".



**Figure 2.3** Dextrose Monohydrate

## 2.2 Product Review

In Indonesia, cookies are a popular snack because they have various shapes and delicious tastes. The variety of ingredients added to cookies will determine the resulting shape and taste (Wulandari et al., 2016). There are various interesting variations of cookies, such as nastar, kastengel, semprit, and snow white cookies (Pau, 2024).

Snow white cookies are a type of crescent-shaped cookie and the surface is covered with powdered sugar. The water content in snow white cookies is quite low so the shelf life is around 4 months. Snow white cookies have a delicious, savory taste and give a melting sensation in the mouth when eaten, so these cookies are very popular. It doesn't require special skills or complicated equipment to make snow white cookies, so it can be said that making snow white cookies is quite easy (N. I. Wibowo & Akbar, 2023). In general, snow white cookies are a typical dish on holidays such as Eid al-Fitr, Christmas and Chinese New Year (Sari, 2022).

Over the past decade, more and more people have been diagnosed with celiac disease, wheat allergies and gluten intolerance (Frauenhoffer, 2024). Individuals like them certainly cannot consume foods that contain gluten. Therefore, the solution for them to be able to enjoy snow white cookies is to substitute all purpose flour by using kepok banana flour. Gluten free refers to foods that do not contain gluten, a protein found in certain grains such as wheat, barley, rye, and triticale. With individuals adopting a gluten-free diet due to their condition, this is certainly the main driver of the market for gluten-free products. Not only that, today more and more consumers are

inspired to achieve better health and want to adopt a gluten-free diet (Grand View Research, 2023).

## **2.3 Process Review**

### **2.3.1 Steaming**

One of the best food processing that almost everyone knows is the steaming technique (Christiana et al., 2021). Steaming is a moist heat cooking method. In the steaming technique, food is processed using heat from water vapor in a closed container or pan. The steamer which has a perforated plate in the middle at the bottom is a tool for steaming. Water as a heating medium will be filled at the bottom of the pan, then at the top there are food ingredients that will be steamed (Stj & Ayuasih, 2024). The steaming technique is classified as an easy cooking method when viewed from a technical perspective (Agustina & Sutisna, 2020). The steaming method is one of the cooking methods that can maintain nutrients, including water-soluble vitamins and those that are sensitive to heat, well. The nutritional or vitamin content of the food will be well maintained during the steaming process. Apart from that, by using the steaming technique the shape of the food will not be damaged. Steamed food ingredients will become soft due to water vapor so that there is less evaporation of the vitamin levels in the nutrients (Nofita et al., 2019). When making banana flour, the bananas are steamed for 10 minutes. This can improve the color and reduce the sap content (Y. Saputra, 2020). Apart from that, steaming aims to deactivate the polyphenolase enzyme, which is the enzyme that causes browning in bananas (Nugraha, 2019). This polyphenolase enzyme is a protein so that when steamed it will experience denaturation and its activity as an enzyme will no longer function (Putri et al., 2015).

### **2.3.2 Drying**

Drying is a way to remove some of the water content from a food by evaporating most of the water content in it using heat energy. The result

of the drying process is dry material that has a water content equivalent to the normal balance water content of the air (atmosphere) or equivalent to the water activity value ( $a_w$ ) which is safe from microbiological, enzymatic and chemical damage. Drying is one of the oldest and most widely used methods of food preservation. Food or agricultural products to be dried should be cut or sliced first so that the drying process will be faster. This is because cutting and slicing will expand the surface of the material so that more of the surface of the material will be in direct contact with hot air (Y. Saputra, 2020). Drying kepok bananas in the process of making kepok banana flour is carried out at a temperature of 60° for 12 hours which aims to reduce the water content in kepok bananas so as to extend the shelf life and prevent spoilage microorganisms from growing (Yuliana & Novitasari, 2014). The heating and drying process also influences the color change of flour. The color of the flour will get darker as the temperature and drying time increase (S. A. Saputra et al., 2023). Apart from that, temperature treatment and drying time have a significant effect on the water content of banana flour. As the temperature increases and the length of drying time can reduce the water content of banana flour. This happens because higher temperatures and long drying times can cause water to evaporate from banana flour, so that the resulting flour becomes drier (Ibrahim & Albaar, 2020).

### **2.3.3 Baking**

The baking technique is a technique of indirectly cooking food over hot coals. This food processing technique is usually done using an oven. The term baking can also be defined as a technique for cooking ingredients food with a minimum temperature of 121°C. Generally, food products that use baking techniques are pastry and bread (Karimah et al., 2022). The baking technique is used to process raw materials into food that is suitable for consumption by baking it until changes in shape, color, taste, texture and aroma appear (Prima, 2022). The temperature and baking time must be considered to produce a maximum product. The



baking temperature setting must be adjusted, a baking temperature that is too high can cause the cake to burn and the color to be unattractive. A baking temperature that is too low causes the cake to tend to be stiff and not rise (Firdausa, 2020). The temperature used in making snow white cookies is 135° for 20 minutes. The temperature and length of baking time will affect the moisture content of the cookies. The longer the baking time for cookies, the more evaporation will occur in the ingredients contained in the ingredients, resulting in a dry cookie product. The resulting cookies are immediately cooled to reduce the temperature and hardening of the cookies due to solidification of the sugar and fat (Yashinta et al., 2021).