

CHAPTER 4

RESULT AND DISCUSSION

4.1 Product Result

The nutritional value of Kepok banana starch pempek is based on its ingredients. Major ingredients in Kepok banana starch pempek are banana starch, sago flour, and tenggiri fish. Kepok banana starch is obtained by precipitating a filtered banana and water solution. Resistant starch content in kepok banana starch is 27.70%. The amount of resistant starch in kepok banana starch is higher than the amount of resistant starch in cassava starch which only contain 1.8%. Consuming meals with a low glycemic index (GI), high resistant starch, and high fiber content can enhance insulin sensitivity and help manage blood sugar levels by slowing down the rate of absorption of glucose (Afifah *et al.*, 2020). Which means this pempek is safe to eat for diabetic patient.

Based on the sensory test results, banana starch pempek has a good appearance and delicious aroma. 9 out of 10 panelists liked the appearance and aroma of the pempek. However, 7 out of 10 panelists didn't like the texture of the pempek. Some panelist stated that the texture is too dry and not chewy enough, so it is unpleasable to eat. In terms of taste, 5 out of 10 panelists didn't like the taste of the pempek and 5 other panelist approve for the taste.

4.2 Nutrition Fact

4.2.1 Nutrition Table

The nutritional value of Kepok Banana Starch is as follows:

Table 2.1 Nutritional Value of Kepok Banana Starch

Nutrition	Total/100 g
Moisture (%)	6.83
Lipid (%)	0.06
Protein (%)	1.01
Total Starch (%)	82.69
Amylose (%)	40.88

Source: Marta *et al.*, 2022

Table 4.1 Nutritional Value of Spanish Mackerel per 100 g

Calorie (kcal)	112
Fat (g)	2.3
Protein (g)	21.4
Water (ml)	75,35

Source: Afifah, 2019

Table 4.2 Nutritional Value of Sago Flour per 100 g

Calorie (kcal)	353
Protein (g)	0,25
Fat (g)	0,41
Ash (g)	0,27
Carbohydrates (g)	89,45
Calcium (mg)	1.131

Source: Tahir *et al.*, 2018; Soeparyo *et al.*, 2018

4.2.2 Nutrition Calculation

Nutritional value of Kepok banana starch pempek

Table 4.3 Nutritional Value of Kepok Banana Starch Pempek

Ingredients	Calories (kcal)	Carbs (g)	Protein (g)	Fat (g)	Sugar (g)	Fiber (g)	Sodium (mg)
Mackerel fish (250g)	302		53,49	8,24			132
Kepok banana starch (100g)		82,69	1,01				
Sago flour (60g) Water	211,8	53,67	0,15	0,246		1	1
Egg white (30g)	17	0,24	3,6	0,06	0,23		55
Garlic (27g)	40	8,93	1,72	0,13	0,27	0,6	5
Mushroom powder (10g)	20	2	0,3	0,5			150
Salt (5g)							1938
Pepper (5g)	17	3,33					
Brown sugar (250g)	942	243,33			240,52		98
Roast ebi (7g)	19,8811	0,33	5,91	0,37			17
Chili (3g)	10	1,7	0,36	0,52	0,31	0,8	1
Sugar (15g)	58	15			14,99		0,3
Tamarind (7g)	17	4,38	0,2	0,04	4,02	0,4	2
Vinegar (5 ml)	3	0,01					
TOTAL	1.658	361,84	64,97	9,996	260,34	2,8	2.393,92

4.2.3 Nutrition Label

Nutrition Facts	
6 servings per container	
Serving size	1 piece (40g)
Amount Per Serving	
Calories	90
<small>% Daily Value*</small>	
Total Fat 0.5g	1%
Saturated Fat 0g	0%
Trans Fat 0g	
Sodium 135mg	6%
Total Carbohydrate 20g	7%
Dietary Fiber 0g	0%
Total Sugars 14g	
Includes 0g Added Sugars	0%
Protein 4g	8%
<small>Not a significant source of cholesterol, vitamin D, calcium, iron, and potassium</small>	
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

Figure 4. 1 Nutrition Fact of Kepok Banana Starch Pempek

4.3 Food Safety and Packaging

4.3.1 Processing and Storage Temperature

The process of making banana starch pempek is divided into two parts. The first step is to make the Kepok Banana Starch which takes approximately 3 days. The first step is peeling, slicing, and weight the raw banana. Then submerge sliced banana in water for 30 minutes. Then grind the banana and water with a blender until smooth. Then squeeze the banana juice and precipitate the liquid until the starch settle for 24 hours. After that dry the wet starch for 2 days and then grind using a blender and sieve with mesh 80 to achieve a fine texture. The second step is making the pempek dough and cuko.

Banana starch pempek is considered as wet food and should be stored in a cold storage like freezer (-18° C) to maintain quality and extend shelf life. Frozen pempek can last up to 1 month but should be consumed within 1 week for the best quality. Meanwhile pempek stored in room temperature (20°C - 25°C) only last for 2 days (Matura, 2022).

4.3.2 Shelf Life

The water content of pempek, which ranges from 50 to 60 percent of its wet weight, makes it categorized as a semi-wet food. Since pempek contains a lot of water, storing it at room temperature for more than three days will result in enzyme and microbial activity which cause it to spoil and unfit for consumption (Alhanannasir *et al.*, 2020). Therefore, to extend shelf life pempek is stored in freezer and could last up to 1 month.

4.3.3 Product Packaging

Food packaging is essential for ensuring the quality and safety of food, extending shelf life, reducing food losses and wastage, and protecting food from environmental contamination and other influences such as odors, shocks, dust, temperature, physical damage, light, microorganisms, and humidity (Han *et al.* 2018).

Pempek is an easily harmed food because of its high protein and water content. Changes in the pempek's flavor, texture, color, and scent are signs of deterioration (Pratama *et al.* 2021). In order to extend the shelf life, Banana starch pempek is packed using vacuum packaging. The air in the package is changed in composition by vacuum, which lowers the rate of respiration (Natasha *et al.* 2023). By using non-airtight packaging, pempek can only last for 18-24 hours (Samosir, 2022). Whereas with vacuum packaging, pempek can last for 3 days at room temperature and 1 month in the freezer. This vacuum packaging uses embossed nylon vacuum plastic. A

form of plastic known as nylon type plastic is created by mixing nylon and PE, two materials that have the benefits of vacuum, high elasticity, and hardness (Jitmau *et al.*, 2022). Embossed plastic is a plastic that has a textured or non-smooth surface. Vacuum plastic used for the packaging has the dimensions of 15x20 cm.

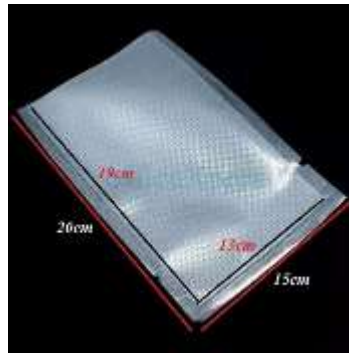


Figure 4. 2 Nylon Embossed Vacuum Plastic

In addition to protecting food, food packaging also needs to be equipped with product identity. Such as nutrition facts, ingredients, and product names.



Figure 4. 3 Food Packaging Label

4.4 Financial Aspects

4.4.1 Product Cost

Product cost is calculated based on the total of all cost per month. The cost consist of raw material cost, packaging cost, labor cost, and utility cost. Working day per month are 25 days. As for raw material, the quantity of raw materials is counted as 6 recipes per day and 18 portions per day, which are 450 portions per month.

1. Start-Up Capital

Table 4.4 Start-Up Capital Cost

Tools and Equipment	Quantity	Price (/unit)	Sub Total
Knife	1	Rp12.000	Rp12.000
Cutting board	1	Rp18.000	Rp18.000
Measuring cup	2	Rp17.000	Rp34.000
Blender	1	Rp618.000	Rp618.000
Mixing bowl	2	Rp20.000	Rp40.000
Food Container	3	Rp10.000	Rp30.000
Filter cloth	2	Rp12.000	Rp24.000
Spatula	1	Rp10.000	Rp10.000
Spoon	1	Rp5.000	Rp5.000
Digital scale	1	Rp24.000	Rp24.000
Sauce pan	1	Rp40.000	Rp40.000
Frying pan	1	Rp189.000	Rp189.000
Strainer	1	Rp12.000	Rp12.000
Mesh 80	1	Rp50.000	Rp50.000
Airtight container	1	Rp20.000	Rp20.000
Vacuum Sealer	1	Rp400.000	Rp400.000
TOTAL			Rp1.526.000

2. Labor Cost

Table 4.5 Labor Cost

Occupation	Personnel	Salary (/month)	Sub Total
Chef	1	Rp2.000.000	Rp2.000.000
TOTAL			Rp2.000.000

3. Packaging Cost

Table 4.6 Packaging Cost

Packaging	Quantity	Price (/unit)	Sub Total
Vacuum Plastic	18	Rp700 (/pc)	Rp12.600
Sticker Label	18	Rp400 (/25pc)	Rp288
Plastic Bag	18	Rp10.200 (/25pc)	Rp7.344
Small Plastic	18	Rp5.500 (/250pc)	Rp396
TOTAL (/day)			Rp20.628
TOTAL (/month)			Rp515.700

4. Utility Cost

Table 4.7 Utility Cost

Facility	Quantity	Price (/unit)	Sub Total
Water	500 L	Rp2.000 (/m ³)	Rp1.000
Electricity	10 kWh	Rp1.500 (/kWh)	Rp15.000
TOTAL (/day)			Rp16.000
TOTAL (/month)			Rp400.000

5. Raw Material Cost

Table 4.8 Raw Material Cost

Raw Material	Quantity	Price (/unit)	Sub Total
Raw kepok banana	12 kg	Rp17.500 (/kg)	Rp210.000
Water	33,6 l	Rp1.000 (/L)	Rp33.600
Mackerel fish	1,5 kg	Rp80.000 (/kg)	Rp120.000
Sago flour	360 g	Rp25.000 (/kg)	Rp9.000
Egg white	180 g	Rp30.000 (/kg)	Rp5.400
Garlic	90 g	Rp3.000 (/100g)	Rp2.700
Mushroom powder	30 g	Rp25.000 (/200g)	Rp7.500
Salt	60 g	Rp9.000 (/kg)	Rp270
Pepper	42 g	Rp50.000 (/kg)	Rp2.100
Brown sugar	1,5 kg	Rp11.000 (/kg)	Rp2.750
Roast ebi	42 g	Rp12.000 (/100g)	Rp5.040
Chili	18 g	Rp5.000 (/100g)	Rp900
Sugar	90 g	Rp14.000 (/kg)	Rp1.260
Tamarind	42 g	Rp5.000 (/150g)	Rp1.400
Vinegar	30 ml	Rp5.000 (/100ml)	Rp1.500
Vegetable oil	700 ml	Rp34.000 (/2L)	Rp11.900
LPG	1 pc	Rp20.000 (/pc)	Rp20.000
TOTAL (/day)			Rp435.320
TOTAL (/month)			Rp10.883.000

$$\begin{aligned}
6. \text{ Total Cost} & \\
\text{Fixed Cost} & = \text{Labor Cost} \\
\text{Variable Cost} & = \text{Packaging Cost, Raw Material Cost, and} \\
& \text{Utility Cost} \\
\text{Total Cost (/month)} & = \text{Labor} + \text{Packaging} + \text{Utility} + \text{Raw Material} \\
& = \text{Rp}2.000.000 + \text{Rp}515.700 + \text{Rp}400.000 + \\
& \text{Rp}10.883.000 \\
& = \text{Rp}13.798.700
\end{aligned}$$

4.4.2 Selling Price

$$\begin{aligned}
\text{Product Price} & = \frac{\text{Total Cost (/month)}}{\text{Total Product Units (/month)}} \\
& = \frac{\text{Rp}13.798.700}{450 \text{ portions}} \\
& = \text{Rp}30.663 / \text{portion} \\
\text{Product Selling Price} & = \text{Product Price} + \left(\frac{\text{Product Price} \times}{\text{Profit percentage}} \right) \\
& = \text{Rp}30.663 + (\text{Rp}30.663 \times 35\%) \\
& = \text{Rp}41.396 = \text{Rp}42.000
\end{aligned}$$