CHAPTER IV
RESULT AND DISCUSSION

4.1 Product Result

Based on sensory evaluation, soybeans cookies have good taste, smell, and appearance. However, in terms of texture, they are not yet satisfactory. Some panelists mentioned that the texture of these cookies differs from regular cookies. They have a less crispy texture, which is attributed to the lack of gluten. Gluten plays a crucial role in providing structure and elasticity to cookies. Without gluten, the dough might be less firm, resulting in cookies that are not crispy. Additionally, the use of oil instead of butter also affects the texture of the cookies. Butter contains about 15-20% water, whereas oil contains no water at all. When butter is baked, the water evaporates and helps create steam, which contributes to a light and crispy texture in the cookies. In contrast, oil, which is 100% fat, does not produce this effect, making the cookies denser and less crispy compared to those made with butter. Gluten-free and high-protein cookies are shown in Figure 4.1.

Figure 4.1 Gluten-free and High-protein Cookies

Based on the image above, it can be seen that the appearance of gluten-free cookies is not significantly different from regular cookies. Although gluten-free, the texture and taste of these cookies are not far off from traditional cookies. Soybean flour provides higher protein content, making these cookies a healthier option for those seeking a nutritious snack

(Hartanti et al., 2023). Additionally, soybean flour imparts a rich and slightly nutty flavor, which can add a new dimension to the cookies taste (Kamilah et al., 2022).

4.2 Nutrition Fact

4.2.1 Nutrition Table

The nutritional value of Soybeans is as follows

Table 4.1 Nutritional Value of Soybeans per 100g

Calorie (cal)	446
Protein (g)	36,5
Fat (g)	19,9
Carbohydrate (g)	30,2
Fiber (g)	9,3
Sugar (g)	7,33
Magnesium (mg)	280
Potassium (mg)	1800
Sodium (g)	2
Calcium (mg)	277
Iron (mg)	15,7

Source : USDA FoodData Central, 2019

Table 4.2 Nutritional value of Rolled Oat per 100g

Calorie (cal)	382
Protein (g)	13.5
Fiber (g)	10.4
Fat (g)	5.89
Calcium (mg)	46
Iron (mg)	4.34
Magnesium (mg)	126
Phosphorus (mg)	387
Potassium (mg)	350
Sodium (mg)	1
Zinc (mg)	2.74

Source : USDA FoodData Central, 2022

Table 4.3 Nutritional value of Canola Oil per 100g

Calorie (cal)	866.6
Protein (g)	0
Fat (g)	100
Carbohydrate (g)	0

Source : Lily Flower Canola Oil

4.2.2 Nutrition Calculation

Table 4.4 Nutritional Value of Ingredients used in The Recipe for Gluten-free and High-protein Soybean Cookies

Ingredients	Calories (cal)	Carbohydrate (g)	Protein (g)	Fat (g)	Fiber (g)	Sugar (g)	Ca (mg)	Fe (mg)	K (mg)	Na (mg)
Canola Oil (105g)	910			105						
Soybeans Flour (100g)	669	45.3	54.75	29.85	13.95	10.995	415.5	23.55	2700	2
Oat Flour (90g)	382	68	13.5	5.89	10.4		46	4.34	350	1
Organic Palm Sugar (30g)	320	28				28			170	10
Cane Sugar (30g)	120.3	29.88		0.096		29.94	0.3	0.015	0.6	0.3
Whey Protein (40g)	162.5	2.75	31.25	1.875		1.25	125	3.6	162.5	87.5
Granola (20g)	90	13	2	3.5	2	3	14			10
Raisins (20g)	65	15	0.7	0.1	1	12			120	3
Vanilla Extract (2,5g)	7	0.3				0.1				1
Baking Soda (2,5g)										630
Salt (0,5g)							0.12		0.04	194
Omega 3 Egg (50g)	71.9	0.483	6.24	5.01	0.75	0.101	24.1	0.84	66.4	64.9
TOTAL	**2797.7**	**202.713**	**108.44**	**151.321**	**28.1**	**85.386**	**625.02**	**32.345**	**3569.54**	**1003.7**

4.2.3 Nutrition Label

4.3 Food safety and packaging

4.3.1 Processing and Storage Temperature

The process of making soybean cookies is divided into two parts: making soybean flour and making oat flour. Soybean cookies use two drying methods: oven and dehydrator. First, to make soybean flour, soybeans are dried with a dehydrator at 50°C for 24-36 hours. Drying at low temperatures helps preserve the nutritional content of soybeans, including proteins, vitamins, and minerals that are sensitive to heat. Low temperatures also help maintain the natural flavor of soybeans, resulting in flour with a fresher and more natural taste.

The next step involves making oat flour. Then, all ingredients are mixed in a container until evenly combined. Once mixed, the cookie dough is divided into several portions, each weighing 10 grams. The divided dough is then flattened and arranged on a baking tray. The next heating process is baking the cookies. The temperature used for baking cookies is 165°C for 10-15 minutes. Proper storage is required to preserve the cookies, such as in airtight, dry, and covered containers.

4.3.2 Shelf Life

The shelf life of cookies can vary depending on the type of cookies, ingredients used, manufacturing method, and storage conditions. Generally, cookies have a relatively long shelf life of 3-6 months with proper storage (Aprilia et al., 2022). However, gluten-free cookies and high protein soybean cookies have a shorter shelf life compared to regular cookies. This is due to the ingredients used and the absence of preservatives. Previous tests have shown that soybean cookies stored in an airtight container for a month still maintain good texture, aroma, and appearance. Therefore, it can be estimated that soybean cookies can last for 2-3 months.

4.3.3 Product Packaging

Before a product is released to consumers, the most important factor to consider is packaging (Widiastini et al., 2014). Packaging serves as the vessel for a product throughout the entire process, from manufacturing to reaching the hands of consumers. Packaging can prevent damage and preserve the product. For instance, it protects against direct sunlight, air humidity, oxygen, contamination from viruses or bacteria, and impacts (Rachmat & Pamungkas, 2014).

Soybean cookies are packaged using one type of food packaging, namely glass jars (see Figure 4.2). Glass is a non-reactive material that does not interact with food, making it safe for storing cookies. Additionally, glass is easy to clean and does not absorb odors or colors.

Figure 4.2 Glass Jar

Glass jars help maintain the freshness and flavor of cookies for longer because glass is non-porous and airtight when sealed tightly. Glass is non-porous and does not react with food, making it a safe choice for food packaging (Pulungan et al., 2018). Glass packaging can help preserve food quality better compared to plastic packaging (Rosmawati et al., 2021). Glass is also a sustainable product, meaning it can be recycled indefinitely without any loss in quantity (Shivsharan, 2014).

Figure 4.3 Label

Figure 4.4 Jar Mockup

4.4 Financial Aspects

4.4.1 Product Cost

Product cost is calculated based on the total of Cost of ingredient, cost of packaging and the additional 10% of the total cost of ingredients and packaging. The profit percentage is 60% of the product price.

1. Cost of Ingredients

Table 4.5 Cost of Ingredients

Raw Materials	Quantity	Price/unit	Sub Total
Canola Oil	105 g	Rp. 56,600/L	Rp. 5,943
Soybeans	150 g	Rp. 19,000/kg	Rp. 2,850
Rolled Oat	100 g	Rp. 22,900/kg	Rp. 2,290
Organic Palm Sugar	30 g	Rp. 21,000/250g	Rp. 2,520
Cane Sugar	30 g	Rp. 18,000/kg	Rp. 540
Whey Protein	40 g	Rp. 79,000/450g	Rp. 7,022
Granola	20 g	Rp. 15,000/100g	Rp. 3,000
Raisins	20 g	Rp. 16,500/250g	Rp. 1,320
Vanilla Extract	2,5 g	Rp. 8,300/60ml	Rp. 345.8
Baking soda	2,5 g	Rp. 4,800/81g	Rp. 148
Salt	0,5 g	Rp. 7.900/500g	Rp. 7.9
Omega 3 egg	50 g	Rp. 36,000/kg	Rp. 1,800
TOTAL PRICE (/Recipe)			**Rp. 27,786.7**

2. Packaging Cost

Table 4.6 Packaging Cost

Packaging	Quantity	Price/unit	Sub Total
Glass Jar	2	Rp. 8,638	Rp. 17,276
Sticker	2	Rp. 2,500	Rp. 5,000
Silica Gel	2	Rp. 75	Rp. 150
Paper	2	Rp. 40	Rp. 80
TOTAL PRICE (/Recipe)			**Rp. 22,506**

Note : one recipe makes two packs

3. Total Cost

Table 4.7 Total Cost

Cost of Ingredients/Recipe	Rp. 27,786.7
Cost of Packaging/Recipe	Rp. 22,506
Total Cost/Recipe	Rp. 50,292.7
Cost of others; 10% of total cost	**Rp. 5,029.27**
TOTAL	Rp. 55,321.97
Product Price/Pack	**Rp. 27,660.985**

4.4.2 Selling Price

Selling Price = Product Price + (Product price x Profit percentage)

= Rp. 27,660.985 + (Rp 27,660.985 x 60%)

= Rp. 27,660.985 + Rp. 16,596.591

= Rp. 44,257.576

= Rp. 45,000.-