

## CHAPTER IV

### RESULT AND DISCUSSION

#### 4.1 Product Result

The nutritional value contained in tempeh crackers is influenced by the ingredients used in the manufacturing process. Starting from the process of making tempeh to the process of making the crackers themselves. The essential ingredients in making this product include dry lotus seeds is relatively high.

Two main ingredients in making these tempeh crackers are dried lotus seeds and mocaf flour. Dried lotus seeds have a calorific value of around 347 calories, 9.7 protein, 1.7g fat, and several other nutritional values. This lotus seed contains several other vitamins that are good for the health of the human body, including sodium, potassium and amino acid content such as *tryptophan, threonine, isoleucine, leucine, lysine and methionine* (Miksusanti et al, 2023)

Mocaf flour is a flour made from cassava confectionery. Mocaf is a word composed of the words 'Modified Cassava Flour). The explanation of the modification itself is changing the molecule's structure by using some biochemical methods. There are several advantages possessed by fiber mocaf flour, including the content of calcium, phosphorus, and it is higher than the content contained in wheat flour. Mocaf flour is also rich in vitamin C (Admin, 2020), which keeps the body's immune system fit. Mocaf flour itself has a different texture from wheat flour, where the sugar content in this flour is low and safe for consumption by everyone, suitable for people with diabetes, autism, and celiac disease. (Administration, 2020). Mocaf flour is an alternative to wheat flour, and this mocaf flour is suitable for people who are avoiding foods with gluten content because this mocaf flour is flour that is categorized as gluten-free flour.

Tempeh stick crackers are also a form of using typical Indonesian food ingredients, namely tempeh, which is processed into crackers so that tempeh

processing can progress because most of the snacks made using essential tempeh ingredients are processed using the frying method, and automatically the amount of fat content contained in food is high. Tempeh stick crackers are also a healthy snack and are gluten-free because they use mocaf flour as a substitute for wheat flour.

## 4.2 Nutrition Fact

### 4.2.1 Nutrition Table

The nutrition value of Long Tempe Crackers is as follows:

**Table 5.** Nutrition Value of Mocaf Flour per 100g

Calorie (kcal)	350
Moisture (g)	12.01
Protein (g)	1.20
Fat (g)	0.60
Carbohydrate (g)	85
Fiber (g)	6
Ash (g)	1.30

Source: NilaiGizi.com, August 21, 2018

Based on the value of the nutritional content contained in the mocaf flour above, it can be seen that the fat content contained in the flour is classified as low. The fiber content in mocaf flour is also relatively high, and it can be said that this flour is better than wheat flour in general.

#### 4.2.2. Nutrition Calculation

**Table 6.** Nutrition Value Of Dry Lotus Seeds per 100 g

Calories (kcal)	347
Moisture (g)	-
Protein (g)	9,7
Fat (g)	1,7
Carbohydrate (g)	76,9
Fiber (g)	14,5
Ash (g)	-

(Miksusanti et al, 2023)

**Table 7.** Nutritional Value of Ingredients used in The Recipe for Tempeh Stick Crackers

Ingredients	Calories (kcal)	Carbo (g)	Protein (g)	Fat (g)	Sugar (g)	Fiber (g)	Sodium (mg/100g)
Dry lotus seed (100g)	332	64,5	15,4	2	-	-	5
Water (700ml)	-	-	-	-	-	-	-
Tempeh yeast (8g)	24	3,06	3,06	0,37	-	1,7	4
Mocaf flour (208g)	720	172	4	-	0	16	70
Full cream milk (140ml)	84	7	4,2	4,2	5,6	0,7	28
Palm sugar (85g)	313	64,6	2,55	8,5	64,6	-	-
Salt (5g)	-	-	-	-	-	-	1938
Baking soda (3g)	-	-	-	-	-	-	821

Butter (120g)	880	-	-	96	-	-	-
Dark chocolate (25/100g)	150	12,5	1,25	10	10	2,5	12,5
<b>Total</b>	<b>2.503</b>	<b>323,66</b>	<b>30,46</b>	<b>121,07</b>	<b>80,2</b>	<b>6,5</b>	<b>2.878,5</b>

One recipe can produce a total of 40 small packs (4 boxes). In one box there are 9 pieces of tempeh crackers. The calorie content listed on the nutrition label is the result of 2,503 kcal divided by 20 packs.

$$2.503 : 40 = 62,57 (60)$$

#### 4.2.3 Nutrition Label

<b>Nutrition Facts</b>	
9 servings per container	
<b>Serving size</b>	<b>1 Pack</b>
<b>Amount Per Serving</b>	
<b>Calories</b>	<b>60</b>
<small>% Daily Value*</small>	
<b>Total Fat</b> 3g	<b>4%</b>
Saturated Fat 0g	<b>0%</b>
<i>Trans Fat</i> 0g	
<b>Cholesterol</b> 10mg	<b>3%</b>
<b>Sodium</b> 70mg	<b>3%</b>
<b>Total Carbohydrate</b> 8g	<b>3%</b>
Dietary Fiber 0g	<b>0%</b>
Total Sugars 2g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 1g	<b>2%</b>
<small>Not a significant source of 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 5.** Nutrition Fact of Tempeh Stick Cracker

### **4.3 Food Safety and Packaging**

#### **4.3.1 Processing and Storage Temperature**

The process of making lotus tempeh crackers is divided into two parts, the first is making tempeh, which takes approximately two days, and the second is processing lotus tempeh into a snack in the form of crackers. Based on trials in making tempeh, time and air temperature are essential and must be considered because these two elements determine the final result of lotus tempeh itself.

In the process of making tempeh, the soaking process and the fermentation process are essential processes. The primary purpose of soaking dried lotus seeds is for lactic acid bacteria to grow naturally to obtain acids suitable for the tempeh fungus's growing conditions (Admin, 2018). This soaking process is carried out for about 12 hours more. After carrying out the subsequent soaking process, the Lotus seeds are cleaned, and the seeds contained in the Lotus seeds are removed because the seeds have a very bitter taste. After cleaning, the next step is boiling using clean water for about 30 minutes or ensuring the Lotus seeds are soft. Lotus seeds that have been softened, filtered, then left to cool, and then roughly chopped, with the aim that the growth of the tempeh fungus can be evenly distributed.

The following process is mixing the lotus seeds with tempeh yeast, assisted by mocaf flour. The purpose of adding mocaf flour is that fermented tempeh, mixed with mocaf flour, tends to have a denser texture and denser fungal growth than tempeh which only uses yeast. The following process is the process of packing the tempeh using plastic, which is then tightly closed and then stabbed with a toothpick to make holes in several parts of the tempeh so that the fermented tempeh can also

get oxygen which helps the tempeh mushroom growth process. Fermentation is usually carried out for 24 hours. Tempeh must be left in a closed and dry place during the fermentation process. When the tempeh mushroom has grown ideally, which can be known by holding the fermented lotus seed solid and fused, then the tempeh is ready to be processed into crackers.

The initial process of making crackers is where the tempeh is cut into smaller pieces, the tempeh is put into the food processor, milk is added, and then mashed until entirely smooth, after smooth the dough, which has been mashed using a food processor is mixed with all the dry ingredients and stirred using a spatula until it blends. And lastly, add the butter and stir until all the ingredients are mixed perfectly. The following process is the process of forming the dough into a long stick shape; in this process, the prepared dough is put into a piping bag and then formed on a tray that has previously been covered with baking paper with the aim that the cooked crackers sticks can later be easily removed and not broken. The dough that has been printed is then baked in the oven for approximately 30 minutes until cooked. Stick crackers that have been cooked are removed and then given the previously melted chocolate. And tempeh stick crackers are ready to be consumed.

Storage of snacks with a low water content usually must be placed in a closed container to keep the texture of the crackers crunchy. Stick crackers are better stored at room temperature and not placed in direct sunlight.

#### **4.3.2 Self Life**

Tempeh crackers are categorized as a dry snack. The water content in a food can determine the age of storage of a food product. The more moist a food is, the faster the self-life of the food is automatically, but inversely proportional to a food classified as dry, usually having a longer shelf-life. In general, the shelf life of crackers is 6-9 months from the day

of packaging (Diane Vucovic, 2023); if it is more than that time, the texture and taste may not be as good as at the beginning of the packaging time.

#### 4.3.3 Product Packaging

Food packaging is essential in keeping the taste and texture the same for the customer. The packaging of a product itself has a function, namely as a protector, especially for products in the form of food. Apart from having a protective role, packaging also has a promotional function (Kumalasari, 2022); a product's packaging can be a characteristic of that product. The appearance and shape of the packaging can also be one of the attractions for consumers.

According to Kumalasari (2022), there are several good product packaging mixes, including practical which aim to make the product easy to process for distribution to various places; the following mixture is inert, namely a packaging that is good in terms of colour, taste, aroma, and does not cause chemical reactions which can change the product. The packaging is waterproof, leak-proof, efficient, economical and several other mixtures.



**Figure 6.** Tray Mika Plastic 8cm X 4,6cm



**Figure 7.** Plastic Kue Kering 7cm X 13cm



**Figure 8.** Box Packaging





**Figure 9.** Logo

Packaging usually used in product packaging in the form of crackers is packaging that can keep the shape of the crackers intact until they reach the hands of the customer. Therefore, the packaging typically consists of two types of packaging, namely mica, which is used as primary packaging as a base and keeps the crackers intact. The second is packaging in water-resistant plastic (secondary packaging) because crackers are one of the snacks which should be stored in a dry place.

#### **4.4 Financial Aspect**

##### **4.4.1 Product Cost (Variable Cost, Overhead Cost, Fixed Cost)**

Product cost is used or incurred during management to produce a product ready to be marketed again. (Sofia, 2021). This product cost includes three elements: raw materials, labour, and factory overhead. Later this product cost will be calculated per unit of product to make it easier to take profit figures from a product. The working day benchmark used here follows the general working time of 25 days in one month.

1. Start-Up Capital

**Table 8.** Start-Up Capital

Tools and Equipment	Quantity	Price (/unit)	Sub Total
Stock pot	1	Rp. 350.000	Rp. 350.000
Blender	1	Rp. 300.000	Rp. 300.000
Cutting board	1	Rp. 50.000	Rp. 50.000
Knife	1	Rp. 100.000	Rp. 100.000
Spatula	1	Rp. 23.000	Rp. 23.000
Large mixing bowl	2	Rp. 71.500	Rp. 143.000
Small mixing bowl	3	Rp. 56.000	Rp. 168.000
Oven	1	Rp. 700.000	Rp. 700.000
Piping bag	2	Rp. 500	Rp. 1.000
Hot Sealer	1	Rp. 59.000	Rp. 59.000
<b>TOTAL</b>			<b>Rp. 1.894.000</b>

## 2. Packaging Cost

**Table 9.** Packaging Cost

Packaging	Quantity	Price (/unit)	Sub Total
Serving plastick	40 sheets	Rp. 35.000 (/50 pcs)	Rp. 28.000
Tray mika plastick	40 pcs	Rp. 47.000 (/100 pcs)	Rp.18.800
Box	4 pcs	Rp. 65.000 (/5 pcs)	Rp. 52.000
<b>TOTAL (/day)</b>			<b>Rp. 98.800 (/4 boxes)</b>
<b>TOTAL (/month)</b>			<b>Rp. 2.470.000</b>

## 3. Utility Cost

**Table 10.** Utility Cost

Facility	Quantity	Price (/unit)	Sub Total
Water	700 L	Rp. 2.100 (/m3)	Rp. 1.470
Electricity	13 kWh	Rp. 1.750 (/kWh)	Rp. 22.750
<b>TOTAL (/day)</b>			<b>Rp. 24.220</b>
<b>TOTAL (/month)</b>			<b>Rp. 605.500</b>

#### 4. Raw Material Cost

**Table 11.** Raw Material Cost

Raw Materials	Quantity	Price (/unit)	Sub Total
Dry lotus seeds	100 g	Rp. 97.850 (/500g)	Rp. 19.570
Tempeh yeast	8 g	Rp. 16.500 (/500g)	Rp. 264
Mocaf flour	208 g	Rp. 17.000 (/500g)	Rp. 7.072
Palm sugar	85 g	Rp. 6.900 (/250g)	Rp. 2.346
Baking powder	3 g	Rp. 12.950 (/110g)	Rp. 353,18
Salt	5 g	Rp. 4.200 (/500g)	Rp. 42
Dark chocolate	100 g	Rp. 16.500 (/180g)	Rp. 9.166
Butter	120 g	Rp. 40.000 (/200g)	Rp. 24.000
Uht full cream	140 g	Rp. 6.250 (/250ml)	Rp. 3.500
<b>TOTAL (/day)</b>			<b>Rp. 66.313,18</b>
<b>TOTAL (/month)</b>			<b>Rp. 1.657.829,5</b>

#### 5. Total Cost

$$\begin{aligned} \text{Variable Cost} &= \text{Rp. 1.657.829,5} + \text{Rp. 2.470.000} + \text{Rp. 605.500} \\ &= \text{Rp. 2.470.000} \end{aligned}$$

$$\begin{aligned} \text{Total Cost (/month)} &= \text{Rp. 1.657.829,5} + \text{Rp. 2.470.000} + \text{Rp. 605.500} \\ &= \text{Rp. 2.470.000} \end{aligned}$$

#### 4.4.2 Selling Price

$$\begin{aligned} \text{Product Price} &= \frac{\text{Total Cost (/month)}}{\text{Total product units (/month)}} \\ &= \frac{\text{Rp. 2.470.000}}{900 \text{ pack}} \\ &= \mathbf{\text{Rp. 2.744,44 / pack}} \\ \text{Product Selling Price} &= \text{Rp. 2.744,44} + (\text{Rp. 2.744,44} \times 50\%) \\ &= \text{Rp. 2.744,44} + 1.372,22 \\ &= \text{Rp. 4.116,66} = \text{Rp. 5.000/pcs} \\ &= \text{Rp. 5.000} \times 9 \text{ pcs} = \text{Rp. 45.000/ box} \end{aligned}$$