

## CHAPTER IV

### RESULT AND DISCUSSION

#### 4.1 Product Result

The product before fermentation will only taste like tea, but after the fermenting process, the final result will be sour and fizzy. After the fermenting process, the flavonoid and polyphenols inside the final product will not change.

The fermentation gives 3,3% total acid, 0,3% acetic acid, 4,8% glucose, 0,6% ethanol, in 9 days of fermenting process with pH average of 4,06 (Pratiwi et al 2011). The acids formed during the fermentation process are acetic acid, lactic acid, malic acid, oxalic acid, carbonic acid, gluconic acid, butyric acid, folic acid, glucuronic acid, chondroitin sulfate, hyaluronic acid, usnat, and also other compounds such as estaminophen, antibiotics, nucleic acids, amino acids, enzymes, as well as vitamin B complex and vitamin C (Greenwalt et al., 2006).

The color will also change depending on the length of the fermentation process. At the beginning of kombucha tea fermentation is dark brown, with increasing length of fermentation of dark brown color becomes lighter, this is due to the ability of micro to do the color degradation. Color degradation occurs because the microbes that utilize the total soluble solid as energy so that over time the solvent in the media will run out and the liquid becomes more clear or colorless (Nainggolan., 2009). The longer the fermentation process lasts, the more acid is produced so that if it is not stopped when the product is ready for harvest it will be dangerous for consumption because the acid level is too high and will be harmful to the stomach, usually the maximum limit for the fermentation process is 14 days, more than that then the product cannot be consumed and can only be a culture starter for new kombucha later. The fermentation process can be slowed down by taking the scoby culture and then packing the drink into a closed bottle and storing it in the refrigerator (Greenwalt, Ledford, Steinkraus., 2006).

The functions of the acids formed during the fermentation process is to bind toxins which then become water-soluble forms so that they are easily removed from the body by acetic acid, lower blood glucose levels by gluconic acid, regulate pH stability in the blood so as to reduce the risk of cancer by lactic acid, protein formation and replacement of damaged cells by amino acids, maintaining the integrity and health of joints by chondroitin sulfate and hyaluronic acid, reducing the production of homocysteine which causes liver disease as well as the production of blood cells and preventing heart disease, stroke, gout by acid folate (Rinihapsari, Catur, 2013).

## 4.2 Nutrition Fact

### 4.2.1 Nutrition Table

The nutritional value of Senna leaf is as follows:

**Table 4.1.** Nutrition Value of Senna leaf per 100 g

Parameters	Leaf (g/100g)
Calorie (kcal)	7.13±0.40
Carbohydrate	47.73±0.01
Moisture	4.49±0.50
Crude protein	18.23±0.13
Crude fibre	15.73±0.03
Crude lipid	3.91±0.01
Ash	9.53±0.06

Source: Abdulwaliyu et al., 2013

**Table 4.2.** Nutrition Value of reed per 100 g

Parameters	Stems(g/100g)
Calorie (kcal)	4.439
Phosphorus	0.14
Calcium	0.33
Crude protein	0.65
Crude fibre	3.94
Sodium	0.02
Ash	0.7

Source: Feedipedia 2021

**Table 4.3** Nutritional Value of Ingredients used in The Recipe for Fermented drink

Ingredient	Calories (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)	Sugar (g)	Fiber (g)	Sodium (g)
Senna Leaf (3 g)	7.13	47.73	0	0	0	0	0
Reed (80 g)	4.43	0	0	0	0	0	0.02
Sugar (180 g)	697	179.96	0	0	0	0	0
Scoby (300 g)							
Water (700 ml)							
<b>Total</b>	<b>708,56</b>	<b>227.69</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.02</b>

#### 4.2.3 Nutritional Label

<b>Nutrition Facts</b>	
1 servings per container	
<b>Serving size</b>	<b>1 bottle (50ml)</b>
<b>Amount Per Serving</b>	
<b>Calories</b>	<b>20</b>
<small>% Daily Value*</small>	
<b>Total Fat</b> 0g	<b>0%</b>
Saturated Fat 0g	<b>0%</b>
<i>Trans</i> Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 0mg	<b>0%</b>
<b>Total Carbohydrate</b> 6g	<b>2%</b>
Dietary Fiber 0g	<b>0%</b>
Total Sugars 4g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 0g	
<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 4.1** Nutrition Label

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

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

Fermented Senna leaf and Reed extract drink is processed through a fermentation process, so that when the product is finished, the fermentation process needs to be slowed down because the fermentation process is no longer needed, the fermentation process also cannot be stopped. the fermentation process will be slowed down in cold temperatures. This must be done because to prevent excess acid levels which are dangerous if consumed by the body. Limit for the fermentation process is 14 days, more than that then the product cannot be consumed and can only be a culture starter for new kombucha later. The fermentation process can be slowed down by taking the Scoby culture and then packing the drink into a closed bottle and storing it in the refrigerator (Greenwalt, Ledford, Steinkraus, 2006).

#### **4.3.2 Self life**

the shelf life of this product will determined by how the product is stored. To slow down the fermentation process, the product must be stored in a chiller because if it is stored at room temperature, the fermentation process will continue and if the fermentation process is excessive, it will cause a pH that is too low and a very high acidity level, which is harmful to digestion. Product can be stored in chiller for a week after 10 days of fermentation process and keep in airtight bottle, but release the seal for once in 2 days because the beverage will release CO<sub>2</sub> gas from the fermentation process.

#### **4.3.3 Product Packaging**

Packaging is a crucial thing in the manufacture of products, packaging must meet industry standards, must meet the storage needs of a product, and must also be the hallmark of a brand. A good packaging must be able to meet these criteria and also be able to attract the attention

of potential consumers, for this reason the choice of packaging must be carefully thought out.

the packaging used for packaging this product is a 50 ml glass bottle, the selection of glass bottles is very effective in beverage storage because glass material cannot be degraded by acids and chemical as a result of the fermentation process so that the taste, color and nutrients contained in the drink will not change, the selection of clear colors also has a function so that the buyer can inspect if there is the desired residue, the buyer can make a return in the note that the seal lid cannot be opened or damaged and should be stored with the lid facing up.



**Figure 4.2** Packaging



Figure 4.3 Logo



Figure 4.4 Label

## 4.4 Financial Aspects

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

Product cost is calculated based on all production cost per month and ingredient per month. If calculated 1 batch production took 10 days of processing. In a month the production will be held in 3 batch before the product can be packed and sell, in 1 batch production will produce 80 bottle, then the product that ready to sell in 30 days will produce 240 bottle in a month.

#### 1. Start up Capital

**Table 4.4** Start-Up Capital

Tools and Equipment	Quantity	Price(/unit)	Sub Total
Stove	1	Rp. 300.000	Rp. 300.000
Sauce pan	2	Rp. 100.000	Rp. 200.000
Sieve	2	Rp. 20.000	Rp. 40.000
Wooden spoon	2	Rp. 20.000	Rp. 40.000
Spoon	2	Rp. 15.000	Rp. 30.000
Gastronome	4	Rp. 40.000	Rp. 160.000
Funnel	2	Rp. 15.000	Rp. 30.000
Glass jar	3	Rp. 40.000	Rp. 120.000
rack	1	Rp. 400.000	Rp. 400.000
Digital scale	2	Rp. 150.000	Rp. 300.000
<b>TOTAL</b>			Rp. 1.620.000

## 2. Labour Cost

**Table 4.5** Labour Cost

Occupation	Personnel	Sallary(/month)	Sub Total
Helper	2	Rp. 500.000	Rp. 1.000.000
<b>Total</b>			Rp. 1.000.000

## 3. Packaging Cost

**Table 4.6** Packaging Cost

Packaging	Quantity	Price(/unit)	Sub Total
Glass bottle	80	Rp. 6500	Rp. 520.000
cardboard box small	3	Rp. 3.500	Rp. 11.500
<b>Total (/day)</b>			Rp. 531.500
<b>Total (/month)</b>			Rp. 1.594.500



#### 4. Utility Cost

**Table 4.7** Utility Cost

Facility	Quantity	Price (/unit)	Sub Total
Water	1000 L	Rp. 1.200 (/m3)	Rp. 1.200
Electricity	1 kwh	Rp. 1.500 (/kwh)	Rp. 1.500
Gas	100 g	Rp. 16.000 (/3kg)	Rp. 533
<b>Total (/day)</b>			Rp. 3.233
<b>Total (/month)</b>			Rp. 9.699

#### 5. Raw Material

**Table 4.8** Raw Material Cost

Raw Material	Quantity	Price (/unit)	Sub Total
Senna Leaf	6 g	Rp. 14.500(2000g)	Rp. 21
Reed	160 g	Rp. 12.000(200g)	Rp. 9.600
Sugar	360 g	Rp. 13.500(1000g)	Rp. 9.720
water	1400 ml	Rp. 18.000(16L)	Rp. 1.575
Scoby	600 g	Rp. 40.000(300g)	Rp. 80.000
Starter Kombucha	200 ml	Rp. 30.000(500ml)	Rp. 12.000
<b>Total (/day)</b>			Rp. 112.916
<b>Total (/month)</b>			Rp. 338.748

## 6. Rent Cost

**Table 4.9** Rent Cost

Facility	Size	Price	Sub Total
Land	10 m x 7 m	Rp. 1.500.000 (/month)	Rp. 1.500.000
Building	10 m x 7 m		
<b>Total (/month)</b>			<b>Rp. 1.500.000</b>

## 7. Total Cost

$$\begin{aligned}
 \text{Fixed Cost} &= \text{Labour and Rent Cost} \\
 \text{Variable Cost} &= \text{Raw material, Packaging, Utility Cost} \\
 \text{Total Cost (/month)} &= \text{Labour} + \text{Utility} + \text{Packaging} + \text{Raw Material} + \text{Rent cost} \\
 &= \text{Rp. 1.000.000} + \text{Rp. 9.699} + \text{Rp. 1.594.500} + \text{Rp. 338.748} + \text{Rp. 1.500.000} \\
 &= \text{Rp. 4.393.447}
 \end{aligned}$$

### 4.4.2 Selling Price

$$\begin{aligned}
 \text{Product Price} &= \frac{\text{Total Cost (/month)}}{\text{Total Product Unit (/month)}} \\
 &= \frac{\text{Rp. 4.393.447}}{240}
 \end{aligned}$$

$$= \text{Rp. 18.306}$$

$$\begin{aligned}
 \text{Product Selling Price} &= \text{Product price} + (\text{Product price} \times \text{Profit percentage}) \\
 &= \text{Rp. 18.306} + (\text{Rp. 18.306} \times 50\%) \\
 &= \text{Rp. 18.306} + \text{Rp. 9.153} \\
 &= \text{Rp. 27.459} = \text{Rp. 27.500}
 \end{aligned}$$