CHAPTER IV
RESULT AND DISCUSSION

4.1 Product Result

The process of producing yogurt involves the fermentation of milk through the addition of Lactobacillus bulgaris and Streptococcus thermophillus bacterial cultures. Through the process of fermentation, the flavor profile of yogurt is going through a transformation, resulting in a sour taste. This can be related to the conversion of lactose into lactic acid by the bacterial strains involved in the fermentation process. Both categories of bacteria possess the ability to go through the process of lactose decomposition, resulting in the production of lactic acid as well as a diverse range of aromatic and flavorful compounds. Lactobacillus bulgaricus plays a prominent role in developing yogurt's aroma, whereas Streptococcus thermophilus primarily contributes to the formation of its taste. The study of Yogurt with Carica Flavor revealed a marginally less dense texture than the typical consistency of yogurt. This outcome was attributed to the addition of a liquid component during the fermentation process, specifically with the addition of blended Carica fruit juice. However, it is anticipated that over time, yogurt with Carica fruit flavor will exhibit a thicker texture due to the binding of water by the protein content the in the yogurt.

The use of honey as a sweetening agent in yogurt enhances the perception of more natural sweetness. However, it is worth noting that the level of sweetness achieved through honey is relatively milder compared to the utilization of sugar or artificial sweeteners commonly used in the production of yogurt. Honey was

selected as a sweetener in the yogurt-making process due to the previous process of candying the carica fruit, which is juiced and combined into the yogurt. The concern with using sugar as a sweetener is that it may excessively enhance the sweetness of the yogurt, thereby compromising its characteristic taste.

Based on the results of a sensory test conducted on 10 panelists, 6 of the 10 participants received product from every sensory point (sight, smell, texture, and taste), whereas 4 of 10 participants gave feedback regarding taste, texture, and smell. The feedback refers to the smell of the yogurt, which is still the same as yogurt in general (it does not have the characteristic smells or aroma of the carica fruit used), and the panelist's opinion that the texture of the yogurt is still not as thick as yogurt in general. 2 panelists felt that the yogurt lacked flavor, and based on the feedback received, this was a result of the level of sweet level in the yogurt. Based on these results, yogurt flavored with Carica is generally acceptable.

4.2 Nutrition Fact

4.2.1 Nutrition Table

The nutrition value of Milk and Carica Fruit is as follows

Table 4. 1 Nutrition value of Milk per 100g

Calories (kcal)	65
Fat (g)	4
Carbohydrate (g)	4,5
Protein (g)	3
Cholesterol (g)	0.04
Fiber (g)	9
Sugar (g)	2,5

Sodium (g)	0,05
Calcium (g)	0.125
Kalium (g)	0,12

Milk has a high fat content, per 100 ml of milk contains 55% fat in it in addition to fat, in 100 ml of milk there are 27% carbohydrates and 18% protein

Table 4. 2 Nutrition value of Carica Fruit per 100g

Calories (kcal)	46
Water (g)	86,7
Carbohydrate (g)	12,2
Protein (g)	12
Fat (g)	0
Fiber (g)	1
Calcium (g)	0,023
Vitamin C (g)	0,078
Phosphor (g)	0,012

(Hasanah, 2010)

In addition to the previously mentioned variety of nutrients, carica fruit is rich in vitamins A, B, and E, beta-carotene, potassium, and iron.

Table 4. 3 Nutrition value of Sugar per 100g

Calories (kcal)	387
Carbohydrate (g)	99,98
Protein (g)	0
Fat (g)	0
Fiber (g)	0
Sugar (g)	99,91
Sodium (g)	0
Kalium (g)	0,002

4.2.2 Nutrition Calculation

The nutrition value of ingredients used in the recipe for Yogurt with Carica Flavor

Table 4. 4 Nutrition Value of ingredients used in the recipe for Candied Carica

Ingredients	**Calories (kcal)**	**Carbohydrate (g)**	**Protein (g)**	**Fat (g)**	**Calcium (g)**	**Sodium (g)**	**Fiber (g)**	**Phosphor (g)**	**Kalium (g)**	**Sugar (g)**
Water (500 ml)	0	0	0	0	0	0	0	0	0	0
Carica Fruit (750 gr)	345	91,5	90	0	0,1725	0	7,5	0,09		
Sugar (100gr)	387	99,98	0	0	0	0	0	0	0,002	99,91
Total	732	191,48	90	0	0,1725	0	7,5	0,09	0,002	99,91

Table 4. 5 Nutrition Value of ingredients used in the recipe for Yogurt with Carica Flavor

Ingredients	Calories (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)	Calcium (g)	Sodium (g)	Fiber (g)	Phosphor (g)	Kalium (g)	Sugar (g)
Candied Carica (120gr)	117,12	30,63	14,4	0	0,0276	0	1,2	0,0144	0,002	2,66
Honey (3tbsp)	270	66	0	0		0	0	0	0	48
Milk (600ml)	390	27	18	24	75	0.3	54	0	0.72	15
Total	777,12	123,63	32,4	24	75,0276	0,3	55,2	0,0144	0,722	65,66

4.2.3 Nutrition Label

Figure 4. 1 Nutrition Fact of Yogurt with Carica Flavor

4.3 Food Safety and Packaging

4.3.1 Processing and Storage Temperature

The production of yogurt flavored with Carica requires multiple steps and a particular sequence. Sterilization, pasteurization, fermentation, and packaging are the sequential stages of the procedure. The three phases of production are designed to prepare all materials for the next step and to ensure the success of the final product. The quality and nutritional value of the final product will depend on how ready the production units or equipment are and how well the right ingredients are chosen.

Sterilization is the elimination of all forms of microorganisms, both vegetative and spore-formed. Microorganisms in concern may include bacteria, viruses, rickettsia, and fungi (Ma'at, 2009). This sterilization process can be accomplished by boiling the tools in water heated to between 100 and 120 degrees Celsius.

The accuracy of the pasteurization and fermentation processes will determine the quality of the final product. The pasteurization process begins by heating the milk to 75 degrees Celsius for 15 seconds and then lowering the temperature to 42 degrees Celsius. After lowering the temperature, the yogurt starter and carica fruit juice are added to the milk and stirred for two minutes. After completing all procedures, the milk will be placed in an incubator for 8 to 12 hours. If the fermentation process has been completed, the success of the product will be determined by the results of the fermentation. If the milk thickens and does not smell, the product can be considered successful and the next process can be carried out; however, if the milk becomes broken, runny, and smelly, the product can be

considered a failure. The fermentation results must be refrigerated for one day and one night if the product is successful. This will thicken and prepare the yogurt for serving.

After undergoing the storage procedure for one night in the refrigerator, the product can be packaged in a standing aluminum foil plastic pouch, which must be stored at 5 degrees Celsius and out of direct sunlight.

4.3.2 Shelf-Life

Meybodi et al. (2020) describe yogurt as a fermented product made from milk and microorganisms. Therefore, the fermented product cannot be stored at room temperature for an extended period; yogurt with a carica flavor must be stored at 5 degrees Celsius after being packaged in a standing aluminum plastic pouch with the lid already secured. At this temperature, yogurt can be stored for 5-7 days. The yogurt's storage period can be extended beyond 7 days if it is placed in the freezer and frozen, but this is not recommended for yogurt with carica flavor, as it contains only natural ingredients and no preservatives.

The shelf life of yogurt after the packaging has been opened is only two to three days, so if the lid is already opened, the product should consume as soon as possible.

4.3.3 Product Packaging

The primary functions of food packaging are protecting food products against external factors and harm, covering the food content, and providing consumers with necessary information regarding ingredients and nutritional composition. Secondary functions of increasing significance include traceability, convenience, and tamper indication. The primary

objective of food packaging serves to enclose food in a manner that is economically viable effectively, meets the standards set by the industry, fulfils consumer preferences, ensures the safety of the food, and reduces the adverse effects on the environment (Marsh & Bugusu, 2007).

Carica-flavored yogurt products have the concept of a yogurt squeeze or yogurt pouch that is available to consume immediately. This concept is utilized in the creation of this product due to the convenience of consuming yogurt squeezes or yogurt pouches. With this concept, it will be simpler for consumers to carry this product anywhere, as it does not require a lot of storage space. In addition, consumers can consume Carica-flavored yogurt anywhere and at any time because it is ready-to-eat.

Yogurt products with a Carica flavor will be packaged in 100 ml-sized standing pouches. Plastic, cardboard, and aluminum are some of the common materials used to construct standing containers. Fermented products require stability in cold conditions to maintain product safety, so the selected standing container is made of aluminum. This aluminum packaging can also reduce exposure to direct sunlight, in addition to its ability to maintain cold temperatures.

According to (Lamberti & Escher, 2007), aluminum foil is a significant material used in laminates and has extensive utility in the food packaging industry. This material's barrier function is generally superior to that of plastic laminates because it effectively prevents the migration of moisture, oxygen, other gases, volatile aromas, and the damaging effects of light. Furthermore, aluminum foil has been utilized in the production of laminates when its inadequate barrier properties became the main barrier to maintaining the stability of food

during its shelf life.

The chosen packaging dimensions consist of a vertical pouch measuring 8 x 13 cm, with a capacity of 100 ml. This pouch will be utilized to include the product's identity and other essential details.

Figure 4. 2 Standing Aluminum pouch

Figure 4. 3 Logo and Sticker Packaging

4.4 Financial Aspect

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

The calculation of product cost is derived from the summation of all monthly costs. The expenses encompass labor costs, costs of raw materials, costs for packaging, and utility costs. The calculation of labor costs considers the number of working days in a month, which is typically 24 days. This calculation assumes that there are 6 working days and 1 day given as a holiday every week. In terms of raw materials, the quantity of raw materials is measured at a rate of 5 recipes per day or 120 recipes per month, resulting in 30 portions per day or 720 portions per month.

1. Start – Up Capital

Table 4. 6 Start – Up Capital

Tools & Equipment	Quantity	Unit	Price (/ Unit)	Sub Total
Stove	1	Pcs	Rp 550.000	Rp 550.000
Stock Pot	2	Pcs	Rp 237.500	Rp 475.000
Thermometer	1	Pcs	Rp 150.000	Rp 150.000
Ladle	2	Pcs	Rp 38.000	Rp 76.000
Cutting Board	2	Pcs	Rp 50.000	Rp 100.000
Peeler	2	Pcs	Rp 13.500	Rp 27.000
Knife	2	Pcs	Rp 190.000	Rp 380.000
Large Jar (1.8 lt)	2	Pcs	Rp 49.900	Rp 99.800
Scissor	1	Pcs	Rp 7.000	Rp 7.000
Nylon Cloth (L)	2	Pcs	Rp 12.000	Rp 24.000
Small Mixing bowl	3	Pcs	Rp 30.000	Rp 90.000
Large Mixing Bowl	3	Pcs	Rp 34.000	Rp 102.000

Tongs (L)	2	Pcs	Rp 42.900	Rp 85.800
Spoon	10	Pcs	Rp 4.100	Rp 41.000
Digital Scale	2	Pcs	Rp 66.500	Rp 133.000
Measuring Cup	1	Pcs	Rp 15.000	Rp 15.000
Yogurt Maker (Include incubator and yogurt bowl)	5	Pcs	Rp 250.000	Rp 1.250.000
Small Funnel	2	Pcs	Rp 3.000	Rp 6.000
	Total			**Rp 3.611.600**

2. Labor Cost

Table 4. 7 Labor Cost

Occupation	**Personnel**	**Salary (/ Month)**	**Sub Total**
Chef	1	Rp 3.000.000	Rp 3.000.000
Assistant Chef	2	Rp 2.100.000	Rp 4.200.000
	Total		**Rp. 7.200.000**

3. Packaging Cost

Table 4. 8 Packaging Cost

Packaging	**Quantity**	**Price (/ Unit)**	**Sub Total**
Standing Pouch Aluminum	30	Rp 1.600	Rp. 48.000
	Total (/ Day)		**Rp 48.000**
	Total (/Month)		**Rp 1.152.000**

4. Utility Cost

Table 4. 9 Utility Cost

Facility	Quantity	Price (/ Unit)	Sub Total
Water	500 L	Rp 9.500 (/m3)	Rp 4.750
Electricity	11.7 kwh	Rp 1.444 (/kwh)	Rp 16.894
	Total (/ Day)		**Rp 21.644**
	Total (/Month)		**Rp 649.320**

5. Raw Material Cost

Table 4. 10 Raw Material Cost

Raw Materials	Quantity	Price (/ Unit)	Sub Total
Carica Fruit	600 gr	Rp 10.000 (/kg)	Rp 6.000
Water	500 ml	Rp 21.000 (/gallon)	Rp 553
Sugar	100 gr	Rp 13.500 (/kg)	Rp 1.350
Fresh Milk	3 lt	Rp 21.500 (/lt)	Rp 64.500
Honey	250 ml	Rp 121.000 (/910g)	Rp 33.242
Yogurt Stater	15 gr	Rp 6.000 (/gr)	Rp 90.000
Gas (3kg)	1/4 kg	Rp 20.000 (/3kg)	Rp. 1.667
Aluminum Foil	½ pack	Rp 17.000 (/pack)	Rp 8.500
Piping Bag	½ pack	Rp 24.500 (/pack)	Rp 12.250
	Total (/ Day)		**Rp 218.062**

	Total (/Month)	**Rp 5.233.488**

6. Rent Cost

Table 4. 11 Rent Cost

Facility	**Size**	**Price (/year)**	**Sub Total**
Shop	2 Floors	Rp 20.000.000	Rp 20.000.000
	Total (/Year)		**Rp 20.000.000**
	Total (/Month)		**Rp 1.666.666**

7. Total Cost

Fixed Cost = Labor cost, Rent Cost, and Utility Cost

Variable Cost = Raw Material Cost, and Packaging Cost

Total Cost (/month)= Labor Cost + Raw Material + Packaging + Utility + Rent Cost

= Rp 7.200.000 + Rp 5.233.488 + Rp 1.152.000 + Rp 639.320 + Rp 1.666.666

= Rp 15.891.474

4.4.2 Selling Price

Product Price = $\frac{\textbf{\textit{Total Cost (per month)}}}{\textbf{\textit{Total Product Units (per month)}}}$

$= \frac{\textbf{\textit{Rp 15.891.474}}}{\textbf{\textit{720 portion}}}$

= **Rp 22.071,49 /portion**

Product Selling Price = Product Price + (***Product Price*** × ***Product*** %)

= Rp 22.071,49 + (Rp 22.071,49 × 20x%)

= Rp 22.071,49 + Rp 4.414,29

= Rp 26.485,78 ≈ Rp 26.500,00