CHAPTER IV

RESULT AND DISCUSSION

4.1 Product Result

The nutritional value of arrowroot cendol depends on the ingredients. The main ingredients of arrowroot cendol are arrowroot starch , palm sugar and non-dairy creamer where according to Ratnaningsih et al (2010), arrowroot tuber starch can be used as an ingredient wheat substitution in food processing. Arrowroot starch is one form the purest natural carbohydrates and has a high viscosity. Composition arrowroot starch chemistry, namely water 8.6%; ash 0.2%; protein 0.65%; fat 0.26%; coarse fiber 0.125%; and amylose 31.35% (Suryaningtyas, 2013) and also because arrowroot starch is easier to digest with a digestibility of 84.35%, this is because the form of arrowroot starch is shorter when compared to other types of starch (Enjang Rohman, et al., 2021) which is very suitable to be eaten by babies and also people who are sick, one of which is ulcer sufferers

Non-dairy creamer has a healthy content because it is high in fiber, gluten free, trans fat free, cholesterol free, low in sugar, has a low glycemic index, and is able to suppress hunger longer, so it is healthier to be consumed regularly and is very safe for sufferers lactose intolerance milk (lactose intolerance), gluten and palm sugar allergy sufferers have a smooth and soft textured caramel shape, have a very low Glycemic Index (GI), namely GI 35, meaning that glucose absorption takes place slowly thereby lowering blood sugar levels in diabetics, does not cause obesity or overweight, the processing does not use chemicals so it is safer for consumption and contains useful pharmacological elements such as riboflavin, thiamin, niacin, ascorbic acid, calcium and others (Abdul Rahim, 2015) which is very suitable to be taken

together with arrowroot cendol

4.2 Nutrition Fact

4.2.1 Nutrition Table

The nutrition value of Arrowroot Starch is as follows;

Table 4.1 Nutrition Value of Arrowroot Starch per 100 g

Nutrition	Total/100 g
Calories (kcal)	355
Protein (g)	0,7
Fat (g)	0,2
Carbohydrate (g)	85,2
Fiber (g)	3,4
Calcium (mg)	8
Iron (mg)	1,5
Magnesium (mg)	3

(Literature, 2020)

The starch from arrowroot flour has a nutrition composition of 11.9% water, 0.58% ash, 25.9% amylose, 0.14% protein, 0.84% fat, 8.7% insoluble dietary fiber, and 5.0% soluble dietary fiber. Recent study suggested that the arrowroot flour is a potential source of prebiotics (Harmayani et al. 2011).

The nutrition value of Non-dairy Creamer is as follows:

Table 4.2 Nutrition Value of Non-dairy Creamer per 100 g

Nutrition	Total/100 g
Calories (kcal)	300
Fat (g)	20
Carbohydrate (g)	40
Fiber (g)	20

(Mondetactica, 2021)

Non-dairy creamers contain corn syrup solids (60% to 65%), vegetable oil (30%, hydrogenated coconut or palm oil), sodium caseinate (2% to 5%) and other ingredients (emulsifiers, stabilizers, anti-caking agents, and color and flavoring agents) (Xi huang, 2018)

The nutrition value of Palm Sugar is as follows:

Table 4.3 Nutrition Value of Palm Sugar per 100 g

Nutrition	Total/100 g
Calories (kcal)	368
Carbohydrate (g)	92
Sugars (g)	92
Ash (g)	1
Sodium (mg)	15
Calcium (mg)	75
Zinc (mg)	26,4

The content of sucrose in palm sugar is 70-79% as well as 35% of glucose and fructose, Palm contained 3 minerals of Fe, Zn and Cu respectively 9.66%, 1.56%, 1.51% and 6.52%, 1.21%, 0.98% (Yeyen

Maryani, 2021)

4.2.2 Nutrition Calculation

Table 4.4 Nutrition Value of Ingredient used in The Recipe for Arrowroot Cendol

Ingredient	Calories (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)	Sugar (g)	Fiber (g)	Sodium (mg/100g)
Arrowroot starch (75g)	266,25	63,9	0,52	0,1	-	2,55	-
Non-dairy creamer (150g)	450	60	-	30	-	30	-
Palm sugar (200g)	736	184	-	-	184	-	30
Pandan extract (400g)	7	2	10	-	-	20	-
Water (750ml)	-	-	-	-	-	-	-
Total	**1.459,25**	**309,9**	**10,52**	**30,1**	**184**	**52,55**	**30**

4.2.3 Nutrition Label

Nutrition Facts

1 servings per container

Serving size **1 Cup (250ml)**

Amount Per Serving

Calories **290**

	% Daily Value*
Total Fat 6g	**8%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Sodium 5mg	**0%**
Total Carbohydrate 62g	**23%**
Dietary Fiber 10g	**36%**
Total Sugars 37g	
Includes 0g Added Sugars	**0%**
Protein 2g	**4%**

Not a significant source of cholesterol, vitamin D, calcium, iron, and potassium

*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.

Figure 4.1 Nutrition Fact of Arrowroot Cendol

4.3 Food Safety and Packaging

4.3.1 Processing

Producing cendol has several stages, namely weighing, mixing, cooking and printing. Mixing the ingredients is the first step in making cendol where all the ingredients will be weighed. The scales used are digital scales. Digital scales are more accurate in measuring the weight of a material. Compared to manual scales, the units used by digital scales are also up to several decimal places. after all the ingredients have been weighed then mixed in the sauce pan (Anisa Marsha, 2018) where there is an addition of color, this is because consumers will first see the color of a

product when choosing the product they like. The color of the cendol is influenced by the concentrate of the pandan leaf solution and the addition of arrowroot starch which is added to the dough so that it has an attractive color, which is a bright green color, which is produced from pandan leaves (Yeni, 2020)

Cooking is the third stage in making cendol where the ingredients that have been mixed will be cooked using the boiling method and stirred so that all the ingredients are mixed evenly until the mixture is cooked and has a chewy texture. After the cooking process, the finished cendol dough is then printed using a cendol printer so that it becomes oval grains. The temperature drop in the boiled dough affects the final shape in the printing process. Printing must be done immediately before the dough becomes hard and cold.

In the complementary ingredients there are non-dairy creamer gravy and also palm sugar where the non-dairy creamer is given warm water, after which it is stirred until it is evenly mixed and the liquid brown sugar which functions as a sweetener is boiled with water over medium heat until the brown sugar dissolves, then it is filtered to separate impurities from the process of making brown sugar

4.3.2 Self Life

Cendol is categorized as drink because cendol has a high water content. According to Djafar (2010) states that the chemical content of arrowroot tubers per 100 grams are as follows carbohydrates (24.10%), water content (73.50%), protein (1.00%), fat (0.20%), fiber (0.6%), and ash content (1.20%). High water content will trigger enzyme and microbial activity so that cendol can only be stored for 4-6 hours at room

temperature and 42-72 hours at 1-3 C. Signs of damage include destruction of cendol grains, acidification, clumping of creamer.

4.3.3 Product Packaging

Basically the packaging design affects what's in it. Because of that the influence of shape, color, material, packaging design can affect consumers. Consumer behavior that is increasingly critical of product packaging, especially for food product packaging, must receive special attention. Using materials that are environmentally friendly, easy to carry, and safe and does not cause contamination of food, as well as providing adequate product information will be the choice of consumers (Ari widiati, 2019)

Cendol is packaged using a plastic bottle with a PET code. Polyethylene terephthalate (PET) is a versatile thermoplastic polymer that belongs to the polyester polymer group. Polyester resin itself is known for its superior properties in terms of mechanical, thermal, and chemical resistance. Has a fairly good resistance to air (oxygen and carbon dioxide) and humidity, is very hard and light so it is easy and efficient to make packaging

The packaged cendol then put into an HDPE plastic bag. Generally HDPE is slightly opaque, transparent and elastic. HDPE is characterized by impermeability to water, odorless, higher specific strength and heat resistance. Indonesian people are familiar with the term HDPE plastic bags as HD bags, crackle bags, asoy bags, HD plastic bags, or shopping bags. HDPE (High Density Polyethylene) is a raw material for the type of HDPE plastic which generally results in the form of plastic bags, roll plastics, and sheet plastics with a variety of colors.

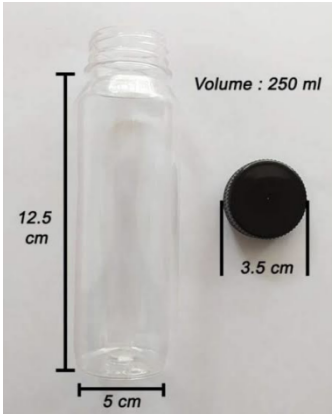

Figure 4.2 Polyethylene terephthalate Kale Bottle 250ml

Polyethylene terephthalate (PET) and High Density Polyethylene (HDPE) for the cendol have dimension of 12,5cm x 5cm (250ml) and 30cm x 10cm respectively

Figure 4.3 High Density Polyethylene 10x30cm

Food packaging is not only to protect food but also as the identity of the product. Food packaging for Arrowroot cendol includes information such as product name, ingredients, nutrition fact, and contact lists

Figure 4.4 Logo

4.4 Financial Aspects

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

Product cost is calculated based on the total of all cost per month. The costs consist of labour cost, raw material cost, packaging cost, and utility cost. The labour cost is considered based on montly working days, which are 25 days pr month. As for raw material, the quantity of raw material is counted as 5 recipes per day or 125 recipes per month, which are 25 portions per days or 625 portions per month.

1. Start Up Capital

Table 4.5 Star-up Capital

Tools & Equipment	Quantity	Price(/Unit)	Sub Total
Sauce pan	1	Rp 180,000	Rp 180,000
Digital Scale	1	Rp 40,000	Rp 40,000
Measuring cup	1	Rp 9,000	Rp 9,000
Bowl	2	Rp 20,000	Rp 40,000
Grater	1	Rp 32,000	Rp 32,000
Wooden spatula	1	Rp 8,000	Rp 8,000
Duster	1	Rp 6,500	Rp 6,500
Mold	1	Rp 32,000	Rp 32,000
Scissors	1	Rp 6,100	Rp 6,100
Stove	1	Rp 120,000	Rp 120,000
	TOTAL		**Rp 474,000**

2. Labour Cost

Table 4.6 Labour Cost

Occupation	Personnel	Salary (/month)	Sub Total
Worker	1	Rp 1,500,000	Rp 1,500,000
	TOTAL		**Rp 1,500,000**

3. Packaging Cost

Table 4.7 Packaging Cost

Packaging	Quantity	Price (/unit)	Sub Total
PET kale Bottle	25	Rp 900 (/pc)	Rp 22,500
Big straw	25	Rp 9,500 (/100pcs)	Rp 2,375
HDPE plastic bag	25	Rp 5,000 (/80pcs)	Rp 1,562
TOTAL (/day)			**Rp 26.437**
TOTAL (/month)			**Rp 660,925**

4. Utility Cost

Table 4.8 Utility Cost

Facility	Quantity	Price (/unit)	Sub Total
Water	1 L	Rp 2,000 (/m3)	Rp 2,000
Electricity	4 kwh	Rp 1,500 (/kwh)	Rp 6,000
Gas	240 g	Rp 20,000 (/3kg)	Rp 1,600
TOTAL (/day)			**Rp 9,600**
TOTAL (/month)			**Rp 240,000**

5. Raw Material Cost

Table 4.9 Raw Material Cost

Raw Material	Quantity	Price (/unit)	Sub Total
Arrowroot starch	75 g	Rp 20,000 (/kg)	Rp 1,500
Water	1500 ml	Rp 4,000 (/pc)	Rp 4.000
Palm sugar	200 g	Rp 6,500 (/200g)	Rp 6,500
Pandan leaf	16 pcs	Rp 3,000 (/pack)	Rp 3,000
Non-dairy creamer	150 g	Rp 94,000 (/kg)	Rp 14,100
Ice cube	1 block	Rp 1,000 (/pc)	Rp 1,000
TOTAL (/recipe : 5 portion)			**Rp 30,100**
TOTAL (/day)			**Rp 150,500**
TOTAL (/month)			**Rp 3,762,500**

6. Rent Cost

Table 4.10 Rent Cost

Facility	Quantity	Price	Sub Total
Place	25	Rp 2000 (/pc)	Rp 50,000
TOTAL (/day)			**Rp 50.000**
TOTAL (/month)			**Rp 1,250,000**

7. Total Cost

Fixed Cost = Labour Cost and Rent Cost

Variable Cost = Raw Material Cost, Packaging Cost, and Utility Cost

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

= Rp 1,500,000 + Rp 3,762,500 + Rp 660,925 + Rp 240,000 + Rp 1,250,000

= **Rp 7,413,425**

4.4.2 Selling Price

Product Price = Total Cost (/month) / Total Product Unit (/month)

= Rp 7,413,425 / 625 portions

= Rp 11.861,48 / portion

Product Selling Price = Product Price + (Product Price x Profit Percentage)

= Rp 11,861,48 + (Rp 11,861,48 x 45%)

= Rp 13,461,48 + Rp 5,337,666

= Rp 17,199,14 = Rp 18.000