

CHAPTER IV

RESULT AND DISCUSSION

4.1 Product Result

The processing of crab shells that has been done produces as much as 365 grams of powdered broth. This rather drastic shrinkage is due to the use of the dehydration method, which decreases the amount of water and moisture from the product before it is processed. Despite being made from crab shells, the end result of this powdered broth has a fine texture as it has undergone repeated grinding, which has been tried and proven by using it to make soup and gave them to several people to try. Moreover, by using the correct amount of spices and seasoning, the product has a distinct crab aroma and flavour without smelling fishy.

As previously mentioned, crab shells retain protein, calcium, phosphorus, and fiber. After being processed and incorporated with other spices and seasonings, the finished result of this product is high in calcium and protein.

4.2 Nutrition Fact

4.2.1 Nutrition Table

Table 4.1 Nutrition Value of Crab Shell per 100 gr

Nutrition	Total/100 gr
Protein	32.95
Crude Fiber	10.89
Calcium	22.93
Phosphorus	0.78

(Azizah et al., 2020)

4.2.2 Nutrition Calculation

Table 4.2 Nutritional Value of Ingredients used in The Recipe for Crab Shell-Based Broth Powder

Ingredients	Calories (kcal)	Carbohydrate (gr)	Protein (gr)	Fat (gr)	Sugar (gr)	Fiber (gr)	Sodium (mg)
Crab Shell (600 gr)			197.7			65.34	
Garlic (110 gr)	164	36.37	7	0.55	1.10	2.3	19
Shallot (150 gr)	108	25.20	3.75	0.15			18
Onion (85 gr)	36	8.59	0.78	0.07	3.64	1.2	3
Roasted candlenut (40 gr)	286	5.13	3.12	30.43	1.66	3.2	106
Salt (30 gr)							11,627
Sugar (17.5 gr)	68	17.50			17.48		
Cooking oil (5 tbsp)	601			68			
TOTAL	1,263	92.97	212.35	99.2	23.88	72.04	11,773

4.2.3 Nutrition Label

Nutrition Facts	
Serving size	(120g)
Amount Per Serving	
Calories	420
<small>% Daily Value*</small>	
Total Fat 33g	42%
Saturated Fat 0g	0%
<i>Trans</i> Fat 0g	
Sodium 3870mg	168%
Total Carbohydrate 30g	11%
Dietary Fiber 24g	86%
Total Sugars 8g	
Includes 0g Added Sugars	0%
Protein 70g	140%
<small>Not a significant source of cholesterol, 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 Fact of Crab Shell-Based Broth Powder

4.3 Food Safety and Packaging

4.3.1 Processing and Storage Temperature

The production of crab shell-based broth powder is more focused on converting crab shell waste into a healthier powdered broth. Therefore other added ingredients solely aims to strengthen the taste of the crab shells so that they are suitable for use as a flavour enhancer.

The method of turning crab shell into broth powder is not particularly varied, although some of the processes are repeated numerous times, such as grinding the crab shells using a blender or food processor and sifting. Before that, the crab shells must be cleaned then steamed for a brief period to vacate the fishy odour. Steamed crab shells can be dried in an oven at a specific temperature to avoid overcooking and diminishing the nutritional value of the crab shells.

To transform dried crab shells into powder, it is necessary to repeat the process of crushing and sieving. These processes are carried out continuously until the crab shell powder is as fine as possible so that

when used, it dissolves and does not leave remains with a texture like sand. Aromatics such as shallots, garlic and shallots are pre-cooked until browned before being incorporated with the rest of the ingredients and combined into the crab shell powder to add an umami flavour to the final product. The result of this process is in the form of a very moist powder mixture.

Producing powdered broth without preservatives and any chemicals is possible using the dehydration method with an electric dehydrator, where the water and moisture content are removed so the microorganisms cannot inhabit (Britannica, 2021).

To achieve an optimal result, the grinding and sifting steps have to be repeated considerable times after being placed in an electric dehydrator for several hours. If the final sifting result appears a bit damp, it can be briefly roasted until it is barely warm so that the nutritious content does not subside significantly. It is advised to store this powdered broth at room temperature in an airtight container and away from direct sunlight to ensure that the taste or quality of the product does not change and has a longer period of storage.

4.3.2 Shelf Life

This crab shell-based broth powder has a different shelf life than other powdered broths on the market. The components used to make this powdered broth differ because it has no preservatives . Starting from the date of production, this product has a shelf life of three months and is still in operation. However, there is no definite shelf life yet because this is a new product that has not been thoroughly researched. It is advised to adhere to storage guidelines to extend the lifespan of the product.

4.3.3 Product Packaging

Food packaging refers to the materials and containers used to store, protect, and preserve food products. It plays a crucial role in ensuring the

safety, quality, and freshness of food during storage, transportation, and consumption (Majid et al., 2018)

Crab shell-based broth powder is considered a spice and it is appropriate to use specific packaging for spices made from PET food-grade plastic. Using an air-tight sealed plastic jar ensures food safety and preservation, maintains quality, and poses little risk of contaminating products with chemicals from the packaging. This is why PET plastic material packaging is considered one of the safest packaging materials (Ibrahim et al., 2022).



Figure 4.2 PET Food Grade Plastic Jar

In this case, the crab shell-based broth powder for each 10g will be wrapped in a 6cm x 8cm tea bag to prevent it from mixing with the dish itself. This is so that the broth powder can be soaked in water and produce broth without leaving any sandy texture in the dish. The tea bags will then be packaged in a 400ml air-tight sealed PET food-grade plastic jar with an approximate height of 7.5cm and diameter of 9cm, with 12 tea bags in each jar.



Figure 4.3 Tea Bag

Aside from being a container and to protect the product, food packaging also includes details about the product. The packaging label informs the consumer about the products contained within the packaging (Prayusi & Andriani, 2022). The label for crab shell-based broth powder includes product name, ingredients, net weight, and nutrition fact label.



Figure 4.4 Food Packaging Label



Figure 4.5 Logo

4.4 Financial Aspects

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

Product cost are referred to the total costs involved in making products and getting it ready for sale. These costs will be calculated on monthly total costs. Consisted of monthly working days calculated labour cost for around 25 days per month and monthly production that takes up to 4 recipes per day or 100 recipes per month that produce 12 portions per day or 300 portions per month.

1. Start-Up Capital

Table 4.3 Start-Up Capital

Tools and Equipment	Quantity	Price (/unit)	Sub Total
Brush	1	Rp 8,000	Rp 8,000
Steamer	1	Rp 300,000	Rp 300,000
Stove	1	Rp 300,000	Rp 300,000
Oven	1	Rp 350,000	Rp 350,000
Dehydrator	1	Rp 1,500,000	Rp 1,500,000
Spice Blender	1	Rp 100,000	Rp 100,000
Sauté Pan	1	Rp 400,000	Rp 400,000
Fine Sifter	1	Rp 20,000	Rp 20,000
Knife	1	Rp 100,000	Rp 100,000
Cutting board	1	Rp 50,000	Rp 50,000
Spoon	1	Rp 2,000	Rp 6,000
Spatula	1	Rp 25,000	Rp 25,000
TOTAL			Rp 3,159,000

2. Labour Cost

Table 4.4 Labour Cost

Occupation	Personnel	Salary (/month)	Sub Total
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Cook Helper	1	Rp 1,500,000	Rp 1,500,000
TOTAL			Rp 1,500,000

3. Packaging Cost

Table 4.5 Packaging Cost

Packaging	Quantity	Price (/unit)	Sub Total
Spice Jar	300 pcs	Rp 5,300 (/pc)	Rp 1,590,000
Tea Bag	3600 pcs	Rp 17,500 (/100pcs)	Rp 630,000
Sticker Label	18 sheets	Rp 5,000 (/17 pcs/sheet)	Rp 90,000
Silica Gel	300 pcs	Rp 7,500 (/100pcs)	Rp 22,500
TOTAL			Rp 2,332,500

4. Utility Cost

Table 4.6 Utility Cost

Facility	Quantity	Price (/unit)	Sub Total
Water	300 L	Rp 2,000 (/m3)	Rp 3,000
Electricity	170 kWh	Rp 1,500 (/kWh)	Rp 255,000
TOTAL			Rp 258,000

5. Raw Material Cost

Table 4.7 Raw Material Cost

Raw Materials	Quantity	Price (/unit)	Sub Total
Crab Shell	2,4 kg	Rp 277,200 (/0,6 kg)	Rp 831,600
Garlic	440 gr	Rp 30,000 (/kg)	Rp 13,200
Shallot	600 gr	Rp 35,000 (/kg)	Rp 21,000
Onion	340 gr	Rp 55,200 (/kg)	Rp 18,768
Roasted Candlenut	160 gr	Rp 14,000 (/50 gr)	Rp 44,800
Salt	120 gr	Rp 13,000 (/kg)	Rp 1,560
Sugar	70 gr	Rp 15,000 (/kg)	Rp 1,050

Cooking Oil	360 mL	Rp 25,000 (/L)	Rp 9,000
Gas (12 kg)	3 kg	Rp 20,000 (/kg)	Rp 60,000
TOTAL (/day)			Rp 1,000,978
TOTAL (/month)			Rp 25,024,450

6. Total Cost

Fixed Cost= Labour Cost

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

Total Cost (/month) = Labour + Raw Material + Packaging + Utility
= Rp 1,500,000 + Rp 25,024,450 + Rp 2,332,500 + Rp 258,000
= **Rp 29,114,950**

4.4.2.Selling Price

Product Price = $\frac{\text{Total Cost (/month)}}{\text{Total Product Units (/month)}}$
= $\frac{\text{Rp 29,114,950}}{300 \text{ portions}}$
= **Rp 97,049.83 / portion**

Product Selling Price = Product Price + $\left(\frac{\text{Product Price} \times \text{Profit Percentage}}{100} \right)$
= Rp 97,049.83 + (Rp 97,049.83 x 35%)
= Rp 97,049.83 + Rp 33,967.44
= Rp 131,017.23 \approx Rp 135,000.00