

## **Economic Analysis of Clove Leaf Oil Distillation Business (Case Study of Clove Leaf Oil Distillation Household Industry in Babang Village, South Larompong District, Luwu Regency, South Sulawesi)**

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### **Abstract**

*The clove leaf oil refining business contributes to job creation and improving the standard of living of clove farmers. The research was carried out in Babang Village, South Larompong District, Luwu Regency from May to July 2021, to find out the description of the clove leaf oil refining business, Break Even Point (BEP), total production and BEP prices as well as the level of efficiency in using the costs of the clover leaf oil refining business. This research is a case study of the clover leaf oil refining household industry in Babang Village, South Larompong District, Luwu Regency. The data used is primary data and secondary data. The data analysis used is descriptive, BEP analysis, and R/C Ratio analysis. The research results show that the clover leaf oil refining business in Babang Village was established in 2010. The distillation technique used was water and steam distillation techniques with a distillation process time of 10 hours. This business does not yet have a business name, product label, and no cash flow records. The results of the BEP calculation for the production amount are 144 kg and the BEP price is IDR 117,790/kg, while the business production amount is 169.2 kg with an average price of IDR 138,500/kg. The results of the comparison of total revenue with total costs (R/C) are greater than one, namely 1.17, which shows that the clover leaf oil refining business in Babang Village has achieved an economic scale and is efficient in terms of cost use.*

**Keywords:** *Clove leaf oil, BEP, Efficiency.*

### **INTRODUCTION**

One of Indonesia's superior products that produce large commodities is the clove plant (Aromatic Syzygium). Approximately 95% of clove plantations are cultivated by the people in the form of community plantations spread across all provinces in Indonesia and the remaining 5% are cultivated by private plantations and state plantations. Clove plants have the potential to produce essential oils. Clove essential oil is very necessary for various industries such as raw materials for food Flavors and fragrances (flavour and fragrance ingredients), the cosmetic industry, the pharmaceutical industry, preservative and insecticide industry. The benefits of clove leaves for health are anti-oxidants, treating skin diseases, treating respiratory infections, anti-inflammatory, etc.

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Clove plants that are more than 20 years old can collect an average of 0.96 kg/tree of dry leaves every week, while plants that are less than 20 years old can collect 0.46 kg/tree (Arizona, 2016).

The clove tree has a distinctive odor that comes from the essential oils found in the flowers (10-20%), stems (5-10%) and leaves (1-4%). Clove leaves contain 1-4% oil, both dry and fresh leaves, so they can be extracted into an essential oil that has high economic value. The largest component contained in clove essential oil is eugenol, amounting to 70-80%. In general, clove leaves tend to be thrown away because they are considered waste even though they can produce oil and have more economic value (Tuganitya et al, 2019).

Luwu Regency is one of the largest clove producers in South Sulawesi. From Luwu district plantation data, the clove plantation area is 16 thousand hectares spread across 20 sub-districts, namely Larompong, South Larompong, and West Suli sub-districts which are the highest clove producers. South Larompong District, as the second highest clove producer, has a plantation area of 5,099 hectares with a total of 2,594 farmers, which can be seen in Table 1.

Potential planting areas, as well as added value (added value) flowers, deciduous clove leaf oil, and stems, show the prospect of promising market opportunities through the development of a clove oil product processing industry, to strengthen the economic competitiveness of the Luwu region. The establishment of a clove leaf oil factory that is carried out naturally will not only be more sustainable and adaptive but will also make it easier for clove farmers to deal with rubbish/waste, as well as increase the value of clove leaves which were initially just waste into a useful product, including improving income. clove farmers.

Table 1. Area, Production and Number of Clove Farmers in Luwu Regency 2018

No	Subdistrict	Land Area(Ha)	Production Amount (Ton)	Number of Farmer (Person)
1	Larompong	5950,5	3200	3607
2	South Larompong	5099	2978	2594
3	Suli	430,5	85	1366
4	West Suli	1859	625	1238
5	Belopa	146	-	220
6	Kamanre	-	-	-
7	North Belopa	4,5	1	19
8	Bajo	269	82	169
9	West Bajo	420	175	491
10	Bassesangtempe	178	49	274
11	Latimojong	643	198	1051
12	North Bessesangtempe	194	65	240
13	Bupon	402	120	863
14	Ponrang	87,5	40	60
15	South Ponrang	10	-	200
16	Bua	266	43	290

17	Walenrang	160,5	29	253
18	East Walenrang	20,5	1	18
19	Lamasi	47	18	82
20	North Walenrang	632	280	569
21	West Walenrang	49	15	286
22	East Lamasi	-	-	-
Total		16.868	8.004	13.890

Source: Official Portal of Luwu Regency, 2021

The main raw material used in clove leaf oil is dried clove leaves that have fallen, this causes the clove leaf oil refining business to be seasonal because it is very dependent on the availability of raw materials. The availability of raw materials in the dry season is abundant, and conversely, in the rainy season, the supply of raw materials is reduced. Even though resources are still relatively limited, in Babang Village there are already 8 clove leaf oil refining businesses. This business supplies raw materials for dried clove leaves from local villages and villages around South Larompong District, such as from villages in Larompong District.

The problems of high production costs and sometimes low production yields, production profits, minimum production that must be maintained, and minimum selling prices that must be achieved, as well as business cost efficiency, also influence the sustainability of the clove leaf oil refining business, especially in Babang Village. Therefore, it is important to carry out an economic analysis of the clove leaf oil refining business in Babang Village, Larompong District, Luwu Regency.

## RESEARCH METHODS

The research was carried out from April to May 2021, the case in this research was one of the household industries, the clove leaf oil refining business in Babang Village, South Larompong District, Luwu Regency, South Sulawesi. The data used in this research are primary data and secondary data. Primary data was obtained from direct observations and interviews with business owners and employees as well as traders. Secondary data was obtained via Internet media, namely from website official agencies such as the Luwu Regency Central Statistics Agency. The data collection techniques used were observation, interviews, documentation, and literature study.

The data analysis used is descriptive, Break-Even Point (BEP) analysis of quantities and BEP prices as well as R/C Ratio analysis. Descriptive analysis to describe the conditions of the clove leaf oil refining business. The formula used to calculate BEP Production Quantity and BEP price is as follows:

$$\text{BEP Production} = \frac{\text{TC}}{\text{P}}$$

TC = Total Cost (Total Cost)

P = Price (Price)

If the Production BEP is smaller than the business's Production Amount, then the business is in a profitable position and if the Production BEP is the same as the Production Amount, then the business is at the break-even point or no profit/no loss.

If the Production BEP is greater than the business's Production amount then the business is in an unprofitable position.

$$\text{BEP Price} = \frac{\text{TC}}{Q}$$

Q = Total Business Production

If the BEP price is lower than the selling price, then the business is in a profitable position and if the BEP price is the same as the selling price, then the business is at the break-even point or no profit/no loss. If the BEP price is greater than the selling price, then the business is in an unprofitable position.

To calculate the efficiency of cost use, R/C Ratio analysis is used criteria: If the R/C ratio > 1 means the business being carried out is efficient or profitable. R/C ratio < 1 means that the business carried out is inefficient or unprofitable. R/C ratio = 1 means the business is breaking even (break-even point)

## RESULT AND DISCUSSION

### 1. Overview of Clove Leaf Oil Refining Business

The clove leaf oil refining business was established in 2010, located in Babang Village, South Larompong District, Luwu Regency with the consideration that the raw materials were available in this area because it was close to clove plantations so that it could reduce the cost of transporting raw materials and there were no similar businesses in the area. Apart from considering business location, the price of clove leaf oil products is high, making it attractive to start a business.

The initial capital to set up this business came from its capital amounting to IDR. 67,326,000, - which was used to purchase production equipment including a kettle, furnace, and jar for storing production results. Costs used during the production process are not recorded in the cash flow book so the owner does not know the net profit obtained.

This clove leaf oil refining business does not yet have a business name or product label. The reason is that the essential oil produced is raw essential oil which still needs to be processed before being used directly. However, the name of the business has a great influence on the introduction of the business to the wider community. The essential oil produced from distilling clove leaf oil is marketed to collectors. The location of this collecting trader is in Rante Belu Village, Larompong District.

#### a. Production Equipment

Production equipment includes various facilities used in the production process. Production equipment in the clover leaf oil refining business can be seen in Table 8.

Table 8. Production Equipment Clove Leaf Oil Distillation Business.

No.Tool	Amount	Unit price (Rp)	Investment (Rp)	Amount
1 1 Set (Furnace and Building)	1	15.000.000	15.000.000	
2 1 Set (boiler, cooling tub1 and pipe)		50.000.000	50.000.000	
3 Dinamo Air	2	650.000	1.300.000	
4 Human	3	50.000	150.000	
5 Spon	1	50.000	50.000	

6	Oil Pump	1	25.000	25.000
7	Oil Filter	1	350.000	350.000
8	Spoon	1	20.000	20.000
9	So	1	5.000	5.000
10	Shovel	1	70.000	70.000
11	Funnel	1	120.000	120.000
12	Baskom	1	20.000	20.000
13	Jergen	2	38.000	76.000
14	Bag	40	3.500	140.000
Total				67.326.000

Source: Processed Primary Data, 2021

**b. Raw Material**

The raw materials used in this clove leaf oil refining business are dried, fallen clove leaves purchased from farmers/people in South Larompong District, Larompong District and Pitumpanua District, Wajo Regency, and once came from Palopo City and Soppeng Regency. The owner of a clove leaf oil refining business in Babang Village and clove farmers from that area already have a cooperation contract. Raw material prices start from IDR 1,500/kg - IDR 3,000/kg. The raw materials used are 450-500 kg/production which is processed for 10 hours. Sources of raw materials used in the clove leaf oil refining business can be seen in Table 9.

Table 9. Sources of Raw Materials for Clove Leaf Oil Refining Business

Source	Quantity (kg)	Percentage
Babang Village	3.466	59,3%
Sampano Village	956	16,3%
Rante Belu Village (Larompong District)	1.428	24,4%
Total	5.850	100%

Source: Processed Primary Data, 2021

There is a shortage of raw materials from permanent suppliers in South Larompong and Larompong Districts due to changes in weather from the dry season to the rainy season which has an impact on the yield of clove leaves. So clove leaf oil entrepreneurs looked for suppliers from neighboring areas

**c. Adjuvant**

In the clove leaf oil refining production process, additional materials in the form of water and fuel are needed. Water is used as a cooling medium in the condensation process (the process of changing gas or steam into liquid). The fuel used in the production process is firewood and clove leaf dregs from previous production results. Firewood is purchased in the surrounding community, in one purchase of 1 cubic for IDR 100,000/cubic for one production.

#### d. Production Process

The production process is an activity of processing raw materials into semi-finished goods or finished goods that are ready to be marketed. The process of refining clove leaf oil is carried out using a distillation technique using water and steam or a steam system. Water and raw materials do not come into direct contact because they are limited by filters. The flow of the clove leaf oil refining production process can be seen in Figure 2

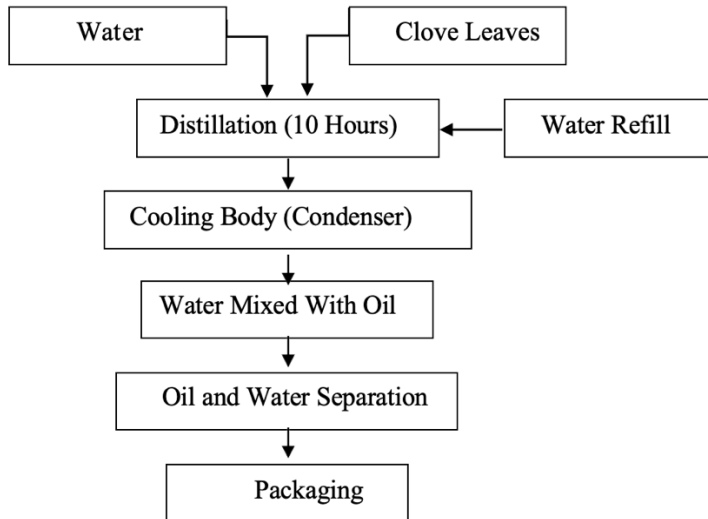


Figure 2. Production Process Flow of Clove Leaf Oil Distillation

The production process for refining clove leaf oil is as follows.

1. Water is put into the kettle until it is below the filter level and the water is also put into the cooling tub. This process takes 30-45 minutes.
2. The kettle on the stove is heated using firewood and leaf pulp.
3. Clove leaves that have been weighed 450-500 kg are put into the kettle gradually. This is done so that the leaves in the kettle wilt so that the kettle can contain 450-500 kg of raw materials. then close the kettle tightly so that there is no leak. This process takes 60-90 minutes. The distillation process was carried out for 10 hours. During the distillation process, the water is refilled twice, namely once every 4 hours. Refilling water takes 15-30 minutes.
4. The steam produced then passes through the cooling tub. In the cooling tank, condensation occurs, namely the change of vapor to liquid.
5. The results of condensation are water and oil.
6. Separation of water and oil. This process is carried out starting from the release of water and oil from the cooling tub until the distillation results no longer contain oil. At this stage, the tools used are a bucket to collect water and oil, a sponge to absorb oil, an oil pump to absorb oil at the bottom of the bucket, a filter to filter oil, a spoon to separate water and oil, and a basin for light oil.
7. Packaging, after filtering, the oil is put into a jerry can using a funnel so it doesn't spill.
8. Clove leaf oil is ready to be marketed.

2. Production Costs

Production costs in the clove leaf oil refining business are costs incurred during the 13x production process in one month, which include:

a. Fixed cost

Fixed costs are costs incurred that do not depend on the size of production. The fixed costs used in the clove leaf oil refining business are in the form of equipment depreciation costs and tax costs. The fixed costs incurred can be seen in Table 11.

Table 11. Fixed Costs of Clove Leaf Oil Refining Business

No.	Uraian	Bi	costs (IDR)
1	Biay Equipment Depreciation Costs		2.384.138
2	Biaya P Tax		35.000
	Total		2.419.138

Source: Processed Primary Data, 2021

Table 11 shows that the total fixed costs in the clove leaf oil refining business are IDR. 2,419,138, -

b. Variable Costs

Variable costs in this business are production costs that change according to the amount of production. Variable costs used in the clove leaf oil refining business for 13 distillations for one (1) month, in the form of raw materials, firewood, electricity, water, gasoline and labor. The variable costs incurred can be seen in Table 12.

Table 12. Variable Costs of Clove Leaf Oil Refining Business

No.	Material	Amount	Unit	Unit Price (Rp)	Cost (Rp)
1	Raw material	5850	Kg	2.000	11.700.0000
2	Firewood	13	Cubic	100.000	1.300.000
3	Electricity and Water	1	Moon	390.000	390.000
4	Gas	26	Liter	8. 500	221.000
5	Labor	26	People	150.000	3.900.000
	Total				17. 511.000

Source: Processed Primary Data, 2021

Table 12 shows that the total variable costs for 13 distillations for one (1) month are IDR 17,511,000.

c. Total cost

The total costs incurred during one month for 13 distillations by the clove leaf oil refining business can be seen in Table 13.

Table 13. Total Clove Leaf Oil Refining Business Costs

No.	Description	Cost (Rp)
1	Fixed cost	2.419.138
2	Variable Costs	17.511.000

Total cost	19.930.138
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Source: Processed Primary Data, 2021

Table 12 shows that the total costs used in the clove leaf oil refining business are IDR. 19,930,138, -

### 3. Profit

Profit is the total revenue value minus the total costs incurred in the clover leaf oil refining business for one month with 13 distillations, can be seen in Table 14.

Table 14. Profits of Clove Leaf Oil Refining Business

No.	Description	Amount (IDR)
1	Total Revenue (TR)	23.412.350
2	Total Cost (TC)	19.930.138
	Total Profit	3.482.212

Source: Processed Primary Data, 2021

Table 14 shows that the profits obtained from the clover leaf oil refining business with 13 distillations in one (1) month are IDR 3,482,212,-.

### 4. Break Even Point (BEP) Analysis

BEP calculations for sales volume and per-product unit are as follows.

#### a. BEP For Volume

$$\begin{aligned} \text{BEP Production} &= \frac{\text{TC}}{\text{P}} \\ &= \frac{\text{IDR. 19.930.138}}{\text{IDR. 138.538}} \\ &= \text{IDR 143,860 Kg} \end{aligned}$$

#### b. BEP for Per-Unit Product price

$$\begin{aligned} \text{BEP Price} &= \frac{\text{TC}}{\text{Q}} \\ &= \frac{\text{IDR. 19.930.138}}{169,2 \text{ kg}} \\ &= \text{IDR.177.790 Kg} \end{aligned}$$

From the calculation of BEP amount and BEP price, it can be seen that the amount of production that must be achieved so that the clove leaf oil refining business does not experience losses is 143,860 kg for IDR. 117,790. While the total production in the clove leaf oil refining business is 169.2 kg with an average selling price of Rp.138,538 or greater than the BEP value it can be said that Mr. Arif's clove leaf oil refining business in Babang Village, Larompong District, Luwu Regency, is profitable.

### 5. Business Efficiency

To determine the efficiency of the clove leaf oil refining business, it uses the R/C ratio approach. It can systematically be formulated as follows.



$$\text{R/C Ratio} = \frac{\text{TR}}{\text{TC}}$$
$$\frac{\text{IDR. 23.412.350}}{\text{IDR 19.930.138}} = 1,17$$

From the calculation of the R/C ratio, it can be seen that the clove leaf oil distillation business is declared efficient in terms of cost use, with a value of 1.17 or greater than 1 (one).

## CONCLUSION

Based on the research results from the Economic Analysis of the Clove Leaf Oil Refining Business (Case Study in Babang Village, South Larompong District, Luwu Regency) the following conclusions can be drawn.

1. The research results show that Mr. Arif's clove leaf oil refining business in Babang Village was founded in 2010. The distillation technique used was water and steam distillation with a distillation process time of 10 hours. This business does not yet have a business name, product label and no cash flow records.
2. The results of the BEP calculation, the production amount is 144 kg and the BEP price is IDR 117,790/kg, while the business production amount is 169.2 kg with an average price of IDR 138,500/kg, which shows a value greater than the BEP, meaning the business is profitable.
3. The results of the comparison of total revenue with total costs (R/C ratio) are greater than one, namely  $1.17 > 1$ , or the clove leaf oil refining business in Babang Village is efficient in terms of cost use.

## SUGGESTION

1. Business owners need to provide product names and labels so that the wider public is more familiar with clove leaf oil refining, record cash flows and select raw materials that need to be improved.
2. The large production costs used make businesses have a low level of efficiency so they need to minimize the use of production costs.

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