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**Submission date:** 08-Oct-2024 02:10PM (UTC+0700)

**Submission ID:** 2457597817

**File name:** ICA.pdf (514.42K)

**Word count:** 4304

**Character count:** 22452



## THE ADDED VALUE AND PROFIT ANALYSIS OF CITRONELLA ESSENTIAL AND AROMATHERAPY OIL IN KPH REGION XIII LAKITAN-BUKIT COGONG

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### Abstrak

*Pengolahan serai wangi menjadi minyak atsiri akan menghasilkan nilai tambah pada tanaman serai wangi. KPH Wilayah XIII Lakitan-Bukit Cogong juga memanfaatkan peluang yang ada dengan menjadikan produk turunan minyak atsiri serai wangi sebagai bahan dasar pembuatan minyak aromaterapi. Tujuan dari penelitian ini adalah untuk menganalisis nilai tambah dan seberapa besar keuntungan yang diperoleh dari agroindustri minyak atsiri dan aromaterapi serai wangi di KPH Wilayah XIII LakitanBukit Cogong. Metode yang digunakan dalam penelitian ini adalah analisis keuntungan dan perhitungan nilai tambah menggunakan Modifikasi Metode Hayami. Hasil yang didapatkan pada penelitian ini adalah total keuntungan yang diperoleh dari agroindustri minyak atsiri dan aromaterapi serai wangi adalah Rp115.285.050. Rasio nilai tambah pada produksi minyak atsiri menjadi serai wangi sebesar 41,20% dan pengolahan serai wangi menjadi minyak aromaterapi adalah 72,14%. Kedua rasio nilai tambah ini melebihi angka 40% dan termasuk ke dalam kriteria tinggi.*

**Kata kunci:**  
minyak  
aromaterapi,  
minyak serai  
wangi,  
nilai tambah,  
serai wangi

### Abstract

The processing of citronella into essential oil will result in added value to the citronella. KPH Region XIII Lakitan-Bukit Cogong also utilizes the opportunities available by making derivative products of citronella essential oil as a base for making aromatherapy oil. The purpose of this study was to find out how much profit is obtained and to analyze the added value of citronella essential and aromatherapy oil agroindustry in KPH Region XIII Lakitan-Bukit Cogong. The method used in this study are profit analysis and the calculation of added value using Hayami Modification Method. The results obtained in this study were the amount of profit obtained from the agroindustry of citronella essential and aromatherapy oils is 115,285,050 IDR. The added value ratio by processing citronella into citronella essential oil was 41.20% and by processing of citronella into aromatherapy oil was 72.14%. Both of these value-added ratios exceed 40% and were included in the high category.

**Keywords:**  
added value,  
aromatherapy oil,  
citronella,  
essential oil

**Sitasi:** Yunita, Silvia, T., & Thirtawati. (2024). The Added Value and Profit Analysis of Citronella Essential and Aromatherapy Oil Inkph Region Xiii Lakitan-Bukit Cogong. SEPA (Jurnal Sosial Ekonomi Pertanian dan Agribisnis), 21(1), 125-132. doi: <https://dx.doi.org/10.20961/sepa.v21i1.68698>

## INTRODUCTION

Essential oil is one of the distillation products that have great potential. Citronella oil is one of the highly prospective essential commodities among the 12 essential oils exported by Indonesia. The demand for citronella oil is quite high and even tends to increase, but the price is stable. The contribution of citronella oil to essential oil export revenue is around 6.89%, the third largest after patchouli oil is around 60% and vetiver oil is around 12.47% (Anny et al., 2019). Citronella plays a very large role in the source of foreign exchange and income of farmers as well as the absorption of labor (Damanik, 2007).

Seeing the enormous potential in the agro-industry of citronella oil and encouraging the agro-industrial development of citronella plants as a superior agricultural product in Megangsakti IV Village with the principle of equality and partnership between farmers and entrepreneurs, Kesatuan Pengelolaan Hutan (KPH) Region XIII Lakitan-Bukit Cogong provides access to the community to jointly manage forest areas with agroforestry patterns with forestry plants and other types that have high economic value, accepted by the market, and most importantly also remain possible to maintain forest sustainability, so that a prosperous community and sustainable forests are achieved. KPH Region XIII Lakitan-Bukit Cogong collaborates with BUMDes Citra Kencana to conduct counseling and training for cultivating citronella for farmers in Megangsakti IV Village, where the citronella harvest will be used as raw material in processing essential oil and to increase the income of farmers in Megangsakti IV Village.

Megangsakti IV Village is a village in Megangsakti District, Musi Rawas Regency, South Sumatra. This village is strategic in the development of the plantation sector. Before KPH Region XIII Lakitan-Bukit Cogong empowered farmers in Megangsakti IV Village, these farmers had never cultivated citronella. The main income of the residents in Megangsakti IV Village is from rubber and oil palm plantations. KPH Region XIII Lakitan-Bukit Cogong strives to produce citronella oil and makes farmers in Megangsakti IV Village as suppliers of raw materials for production under the auspices of BUMDes Citra Kencana. This is in line with the objectives of KPH Region XIII Lakitan-Bukit Cogong to empower the potential of the community and realize independent KPH. The process of processing citronella into essential oil will provide added value to citronella itself. KPH Region XIII Lakitan – Bukit Cogong also took advantage of the opportunities that exist by making citronella essential oil derivative products as the basic ingredients for making aromatherapy oil.

Based on previous research by Asmara et al. (2011) about The Added Value Analysis and Efficiency of Clove Oil Agroindustry Business concluded that the clove oil agro-industry in Sawahan District, Nganjuk Regency provides moderate added value which ranges from 15%-40% which is 39.86% and through a business feasibility study shows that the clove oil agro-industry is worth working on and provides benefits for clove oil producers. Pertiwi (2013) stated in her research entitled The Added Value Analysis and Marketing of Agarwood Oil (Case Study at CV Aromindo) based on added value analysis, obtained the added value of processing agarwood into agarwood oil of IDR 66,342,006 per kilogram of raw materials per year and a profit of IDR 57,542,006 per kilogram of raw materials per year or 44.263% of the product value.

By analyzing the amount of added value produced, KPH Region XIII Lakitan-Bukit Cogong can find out that additional value is contained in one unit of output produced (product added value) from the citronella processing process. Added value analysis can also calculate the number of rewards received by employers and labor. By analyzing the added value of citronella, it is hoped that KPH Region XIII Lakitan-Bukit Cogong will be motivated to continue to develop the products sold so that they have added value to increase the company's revenue. The purpose of this study was to find out how much profit is obtained and to analyze the added value of essential and aromatherapy oil of citronella in KPH Region XIII Lakitan-Bukit Cogong.

**RESEARCH METHODOLOGY**

The method used in this study is a case study method. The research was conducted in Megangsakti IV Village, Megangsakti District, Musi Rawas Regency, South Sumatra, by taking data and information on KPH Region XIII Lakitan-Bukit Cogong. The location determination was carried out purposively with the consideration that KPH Region XIII Lakitan-Bukit Cogong is developing an agro-industry of citronella essential oil in Megangsakti IV Village. The data obtained in this study consisted of primary and secondary data. Primary data is data obtained through observation of the field using visits and direct interviews with parties from KPH Region XIII Lakitan-Bukit Cogong. Secondary data were obtained from literature studies, scientific journals, BPS South Sumatra, and Megangsakti Subdistrict Office.

To find out the amount of profit obtained from the agroindustry of citronella essential and aromatherapy oils, the profit analysis with the following formula is used (Soeharno, 2007).

$$\pi = TR - TC$$

where:

$\pi$  = Profit (IDR)

TR = Total Revenue (IDR)

TC = Total Cost (IDR)

The added value analysis used is the Hayami Method Modification (Table 1) by Hidayat et al. (2012). The modifications made are based on calculations that use the value of money, not the weight of the materials and products produced as applicable in the original Hayami Method. In addition, the process time base in this study was one month to take the total expenditure and income for one month of production, while in the original Hayami Method, a one-time production base was used.

Table 1. Added value calculation framework with Hayami Method Modification

No	Variable	Formula
1	Material Purchase Price (IDR/kg)	1
2	Product Selling Price (IDR/kg)	2
3	Total Value Added Per Kg of Output (IDR/kg)	3
<b>I. Output, Input, Price</b>		
4	Output Sales Volume (kg)	4a
	Output Sales Value (IDR)	4b
5	Basic Raw Materials (IDR)	5
6	Direct Labor (HOK)	6
7	Conversion Factors	7 = 4b / 5
8	Direct Labor Coefficient (IDR/HOK)	8 = 4b / 6
9	Labor Wages (IDR)	9
<b>II. Acceptance and Added Value</b>		
10	a. Other Production Input Costs (IDR/month)	10a
	b. Other Operational Input Costs (IDR/month)	10b
11	a. Value Added (IDR/kg)	11a = 4b - (5 + 10a + 10b)
	b. Added Value Ratio (%)	11b = 11a / 4b
<b>III. Reply to the Owner of the Production Factor</b>		
12	Margin (IDR)	12 = 4b - 5
	a. Other Input Donations (%)	12a = (10a + 10b) / 12 * 100%
	b. Entrepreneur's Profit (%)	12b = 11a / 12 * 100%
<b>IV. Value Added Portion Per Kg of Product</b>		
13	a. In Value for Money (IDR)	13a = 11a / $\Sigma$ 11a * 3

b. In Percentage (%)	$13b = 13a / 3 * 100\%$
4 Source: Hidayat et al., 2012	4
There are three indicators of the value-added ratio (Hubels in Apriadi, 2003), namely:	
a) If the magnitude of the value-added ratio is <15%, then the added value is low	
b) If the magnitude of the value-added ratio is 15%-40%, then the added value is moderate	
c) If the magnitude of the value-added ratio is >40%, then the added value is high	

## RESULT AND DISCUSSION

Kesatuan Pengelolaan Hutan (KPH) Region XIII Lakitan - Bukit Cogong is one of the KPH Models in Indonesia which is determined by the Decree of the Minister of Forestry Number: SK. 790/Menhut-II/2009. The existence of KPH is expected to provide easy access to the community to be able to jointly manage the forest. This is by the management vision, namely "KPH Lakitan as a supplier of raw materials for the wood and non-timber industry in a sustainable manner towards independent KPH" (Cahyono, 2017). The citronella essential oil production business unit managed by KPH Region XIII Lakitan-Bukit Cogong produces essential oil and aromatherapy of citronella. Citronella essential oil is sold in bulk, while citronella aromatherapy oil is sold in bottles under the trademark "Cila-Fresh". Citronella distillation was established by empowering farmers and utilizing the potential of oil palm plantations planted with citronella with an agroforestry pattern in Megangsakti IV Village. This business also aims to improve efforts to manage productive businesses based on community businesses.

### Procurement of Raw Material Inputs

The raw materials are obtained from BUMDes Citra Kencana which houses farmers in Megangsakti IV Village in the sale of citronella. BUMDes Citra Kencana collaborates with KPH Region XIII Lakitan-Bukit Cogong as a supplier of raw materials for citronella distillation. BUMDes Citra Kencana collaborates with farmers in planting and harvesting activities that have been arranged with KPH Region XIII Lakitan-Bukit Cogong and conveys the harvesting schedule for refining materials so that the distillation time can be arranged in such a way as to avoid stacking raw materials. KPH Region XIII Lakitan-Bukit Cogong received the results of harvesting citronella from BUMDes Citra Kencana at an agreed price. Farmers sell citronella to BUMDes at a price of IDR 400 per kilogram and BUMDes Citra Kencana resells the citronella to KPH Region XIII Lakitan-Bukit Cogong at a price of 500 IDR per kilogram.

Citronella can be harvested at the age of 6 months, then in the next harvest only 3 months intermittent. The age of citronella plants, if planted with an agroforestry pattern is only 4 years old. The efforts made by BUMDes Citra Kencana and KPH Region XIII Lakitan-Bukit Cogong in meeting the needs of raw materials in accordance with the capacity of the distillation machine are by conducting training and also buying citronella from other villages that do produce citronella.

### Production Process

KPH Region XIII Lakitan-Bukit Cogong produces two types of products, namely citronella essential oil and citronella aromatherapy oil. Aromatherapy oil is a derivative product of citronella essential oil where the aromatherapy oil production process is an advanced process of essential oils that have been obtained in distillation. The distillation process is carried out mechanically using a distillation machine. At first, KPH Region XIII Lakitan - Bukit Cogong had two distillery boilers with a capacity of 100 kilograms each. Distillation of distilleries and production buildings is a facility provided to KPH Region XIII Lakitan-Bukit Cogong by Dinas Kehutanan through Balai Pengelolaan Hutan Produksi (BPHP) Region V.

The production division in the manufacture of essential and aromatherapy oil produces 20 working days in one month with some one worker. The worker's wage is 50,000 IDR per working day. Workers produce aromatherapy oil between refining times because the distillation of this



citronella essential oil takes 8 hours per one production. The stages of making essential oil can be described as follows:

- a. Citronella is weighed using a scale according to the capacity of the leaf kettle to be filled.
- b. The stove is filled with firewood. The furnace is used to heat and boil 80 liters of water used for distillation and usually lasts  $\pm$  1 hour until the water boils.
- c. The citronella is put in a kettle of leaves while waiting for the water to boil. The leaves filled into the kettle are arranged to be even and dense.
- d. After the boiler reaches a pressure of 3.5 to 4 bar,  $\pm$  1 hour after boiling water, the faucet of the steam flow is opened and flowed into the leaf boiler.
- e. Steam has flowed into the condenser (cooling bath) through a pipe. After cooling, the distilled water and oil are flowed into the oil box. The process from the opening of the steam flow faucet to the flow of water into the oil box, can last for 8 hours.
- f. The separation of oil is carried out to separate the oil and water produced in the distillation. The separation of oil and water is still done manually, not yet using special tools. The water and oil produced from the distillation are filtered using monyloth. By using the cloth, oil and water will separate because they have different densities.
- g. Essential oil that has been separated from the water, then stored in a jerrycan with a capacity of 10 liters.
- h. Delivery is carried out using bottles with a capacity of 1 kilogram. Packaging is tried as best as possible so that essential oil does not spill during the shipping process.

The next steps to make aromatherapy oil, are as follows:

- a. Deposition  
Essential oil obtained from the distillation is precipitated for 3 days so that the residual impurities from the distillery can go down to the bottom and not mix with the aromatherapy oil to be made.
- b. Aromatherapy Oil Making  
Essential oil and sol fatin are mixed in a ratio of 80% essential oil and 20 %-sol fatin. Then stir using a stirring bottle.
- c. Cleaning  
So that the outside of the aromatherapy oil bottle does not have oil left, cleaning is carried out using alcohol that is wiped over the entire bottle.
- d. Sorting  
This activity aims to sort out whether there are defective parts of the bottle, stickers that are not perfectly affixed, or other problems before the bottle is ready for sale.
- e. Packaging  
The finished aromatherapy oil is put in an aromatherapy bottle with a capacity of 8 milliliters and the bottle is pasted with a sticker.

### Profit Analysis

The revenue is the result of the sale of a certain amount of output or payment received from another party. The total revenue of the business is influenced by the amount of production produced. The total revenue from the sale of citronella essential and aromatherapy oils in 1 year is presented in the following Table 2.

The total cost is the total amount of fixed costs and variable costs incurred by a business owner to generate a certain amount of profit in a certain period (Zakirno, 2013). The costs used in producing citronella essential and aromatherapy oils in 1 year can be presented in the following Table 3.

**Table 2.** The Total Revenue from The Sale of Citronella Essentle and Aromatherapy Oils

No.	Product	Volume	Unit	Price (IDR)	Total (IDR)
1.	Essential Oils	10,659	bottle	15,000	159,885,000
2.	Aromatherapy Oil	129	kg	240,000	30,960,000

Total Revenue	190,845,000
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Source: Primary Data Analysis Results, 2021

Table 3. The Total Cost in Producing Citronella Essential and Aromatherapy Oils

No.	Cost Type	Total (IDR)
1.	Depreciation Cost	22,327,000
2.	Variable Cost	45,972,950
3.	Fix Cost	7,260,000
Total Cost		75,559,950

Source: Primary Data Analysis Results, 2021

Profit is the acquisition from the agroindustry business activities of citronella essential and aromatherapy oils after a reduction between the total revenue and the total costs used during production activities. Therefore, the profit obtained from the agroindustry of citronella essential and aromatherapy oils is:

$$\begin{aligned} \pi &= 190,845,000 \text{ IDR} - 75,559,950 \text{ IDR} \\ &= 115,285,050 \text{ IDR} \end{aligned}$$

### Added Value Analysis

The amount of added value of one agricultural industry product, in this case, the agroindustry of essential and aromatherapy oils of citronella is very useful for business actors because they can find out the amount of repayment from the production factors used. The added value referred to in this agro-industry is the distillation of citronella into essential oil and aromatherapy oils in KPH Region XIII Lakitan-Bukit Cogong, so as to increase the value of the processed product. This processing process can increase added value by changing the form of agricultural products into semi-finished goods as well as finished goods.

The costs used to calculate the added value of essential and aromatherapy oils are each cost from raw materials to oils' packaging. The calculation of added value using the Hayami Method Modification in the production of citronella into essential and aromatherapy oils can be seen in Table 4.

The data used is an assumption data when the raw material reaches the maximum capacity of the machine, which is 4,000 kilograms per month with a raw material price of 500 IDR per kilogram and an average yield of 0.77% which means that it will produce 31 kilograms of essential oil every month and the essential oil sold is 21 kilograms or 68% of the total distillation at an average price of 240,000 IDR per kilogram, while another 10 kilograms or 32% is processed again into aromatherapy oil "Cila-Fresh" at a price of 2,343,750 IDR per kilogram.

Table 4. Added Value Calculation Using Hayami Method Modification in Citronella Production into Essential and Aromatherapy Oils

No	Variable	Essential Oil	Aromatherapy Oil
1	Material Purchase Price (IDR/kg)	500	500
2	Product Selling Price (IDR/kg)	240,000	2,343,750
3	Total Value Added Per Kg of Output (IDR/kg)	239,500	2,343,250
<b>I. Output, Input, Price</b>			
4	a. Output Sales Volume (kg)	21	12
	b. Output Sales Value (IDR)	5,040,000	28,125,000
5	Basic Raw Materials (IDR)	1,360,000	640,000
6	Direct Labor (HOK)	25	12.5
7	Conversion Factors	3.71	43.95
8	Direct Labor Coefficient (IDR/HOK)	54,400	51,200
9	Labor Wages	680,000	320,000
<b>II. Acceptance and Added Value</b>			

10	a. Other Production Input Costs (IDR/month)	1,512,136	7,152,601
	b. Other Operational Input Costs (IDR/month)	91,193	43,425
11	a. Added Value (IDR/month)	2,076,670	20,228,974
	b. Added Value Ratio (%)	41.20	72.14
<b>7</b>			
<b>III. Reply to the Owner of the Production Factor</b>			
12	Margin (IDR)	3,680,000	27,485,000
	a. Other Input Donations (%)	43.57	26.18
	b. Entrepreneur's Profit (%)	56.43	73.82
<b>7</b>			
<b>IV. Value Added Portion Per Kg of Product</b>			
13	a. In Value for Money (IDR)	22,297.61	2,125,091.90
	b. In Percentage (%)	9.31	90.69

Source: Primary Data Analysis Results, 2021

The output produced from the production of essential oils 21 kilograms per month and aromatherapy oil are 12 kilograms per month, by processing citronella as much as 4,000 kilograms with a total raw material cost of 2,000,000 IDR per month, so that the conversion factors of essential and aromatherapy oils are 3.71 and 43.95. This conversion value shows that every 1 IDR per kilogram of cost incurred to buy citronella will result in 3.71 IDR for essential oil and 43.95 IDR for aromatherapy oil. The labor used for the essential oil production process is 25 HOK and 12.5 HOK for aromatherapy oil.

Other input costs are the cost of using inputs other than citronella in one month of production, in this case the costs used are the production costs and operational costs of each product. The components included in the production cost of essential and aromatherapy oils of citronella are land rental costs, gasoline, and other costs that have been calculated as joint costs, while operational costs that include joint costs on the production of essential and aromatherapy oils of citronella are firewood, water, labor, and electricity. In addition, each product has other auxiliary materials that are included in the operating costs. Other auxiliary materials in the production of essential oil are plastic packaging, bottles with a capacity of 1 kilogram, cardboard, and insulation. While the auxiliary materials for aromatherapy oil are plastic packaging, cardboard, insulation, alcohol, stickers, fatin soles, and 8-milliliter bottles.

The added value obtained from the production of citronella into essential oil is 2,076,670 IDR per month, while the added value produced in processing citronella into aromatherapy oil is 20,228,974 IDR per month which is much greater than that obtained from the added value of citronella production into essential oil. This added value is obtained from the reduction in the sales value of the product with the total cost of raw materials and the total cost of other inputs.

The added value ratio is a comparison between added value and product value. The obtained added value ratio for the production of essential oil is 41.2%. This means that the production of citronella into essential oil provides an added value of 41.20% of the product value. The percentage of added value also indicates that the added value given to the essential oil production process is in the high category. The value-added ratio obtained for the production of citronella into aromatherapy oil is greater when compared to the added value ratio of essential oil, which is 72.14% of the product value and this figure indicates that the added value provided in the aromatherapy oil production process is in the high category.

In return for the services of the owner of the factor of production, the margin is the difference between the value of the output and the raw materials distributed to the contribution of other inputs and profits. The contribution of other inputs to the production process of citronella into essential oil is 43.57% and if it becomes aromatherapy oil is 26.1%. The great profit rate on the production of citronella into essential and aromatherapy oils is 56.43% and 73.82% of the product value, respectively. This advantage indicates the total profit obtained from each production of citronella into individual products.



## CONCLUSION

The amount of profit obtained from the agroindustry of citronella essential and aromatherapy oils is 115,285,050 IDR and the added value obtained from the production of citronella into essential oil was 41.20%, while if processed into essential oil was 72.14%. These two value-added ratios exceed 40% and fall into the high category. Considering that the added value of aromatherapy oil was greater than essential oils that are no longer processed, KPH Region XIII Lakitan-Bukit Cogong should strive to increase labor in the production department so that the production of citronella essential oil can increase and income will also increase. KPH Region XIII Lakitan-Bukit Cogong must also take care of P-IRT or BPOM permits for aromatherapy oil products because these products are medicinal and make them easier to market, such as being sold in supermarkets.

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