

Profitability Analysis of Pak Choy Vegetable Flour: The MSME Mahesty in Malang City

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Abstract. MSME Mahesty, a local enterprise in Malang City, has developed an innovative agricultural product—Pak Choy vegetable flour. As a pioneering business, Mahesty still faces challenges in financial planning and lacks a strong financial security system. This study aims to analyze the profitability of the Pak Choy flour business, assessing its economic performance and sustainability potential. A quantitative approach was employed, utilizing purposive sampling with the MSME owner as the primary respondent. Data were collected through interviews, direct observation, and internal documentation. The analysis used three key indicators: Break-Even Point (BEP), Marginal Income Ratio (MIR), and Margin of Safety (MOS). The results showed a BEP of IDR 190,409.48, a MIR of 38.67%, and an MOS of 87.31%. The overall profitability level reached 33.76%, which is categorized as high since it exceeds the 20% standard benchmark. These findings demonstrate that if MSME Mahesty sells its full production capacity, it can achieve a net profit margin of 33.76%. This indicates a promising financial outlook and business viability. The results can serve as a strategic foundation for improving financial management, supporting business growth, and ensuring the sustainable development of MSME Mahesty in the agricultural processing sector.

1 Introduction

Micro, Small, and Medium Enterprises (MSMEs) in Indonesia play a significant role in supporting the country's economic growth due to their ability to increase market demand [1]. Absorption power, push gap income, and development sector industries [2] become proof that MSMEs hold importance in a welfare society. In addition to contributing to economic growth, MSMEs also have the potential to address public nutrition challenges, including the low level of vegetable consumption in Indonesia.

Data from the Central Statistics Agency (BPS 2019), based on the 2019 National Socioeconomic Survey (Susenas), shows that the average monthly expenditure of Indonesians on vegetables is only 209.89 grams per capita per day. This figure is still far below the recommendation of the World Health Organization (WHO) and the Indonesian Ministry of Health, which recommends 400 grams of vegetable consumption per person daily. This low vegetable consumption indicates a lack of public awareness of nutrition and a limited variety of vegetable dishes in daily life. This situation presents both a challenge and

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an opportunity for innovation in vegetable processing to increase public consumption [3]. One type of vegetable that has the potential to meet the community's nutritional needs is pak choy. This vegetable has a relatively complete nutritional content, including protein, fat, calcium, phosphorus, iron, and vitamins A, B, C, E, and K [4]. This nutritional content benefits health and makes pak choy a potential commodity with high economic value. Therefore, innovation in pak choy processing can be a strategic solution to increase public vegetable consumption while strengthening the added value of local agricultural products in Indonesia.

One concrete example of the contribution of MSMEs in increasing added value, strengthening the local economy, and addressing the community's vegetable consumption needs can be seen in Mahesty MSME, a pioneer in innovative pak choy vegetable flour products in Malang City, which was launched in 2023. Mahesty MSME utilizes local produce, including flour and vegetable Pak Choy, in the District of Starfruit, Malang Regency. Flour vegetable Pak Choy sells at a high enough price. This is due to the material used, namely, vegetable Pak Choy, which is cultivated without pesticides by MSME Mahesty, a partner of Brayat Garden Jatimulyo. Additionally, for guard-quality products, MSME Mahesty does not add any other materials. With the existence of quality processing, the given mark contributes to the competitiveness of agricultural products. In addition to increasing the market from vegetable Pak Choy, sales of flour vegetable Pak Choy increase profitability for the company.

Profitability is the ability of a company to produce profit [5], shown by profit generated from sales and revenue. Profitability refers to a company's ability to efficiently utilize its existing resources to generate profits [6], particularly for new MSMEs launching new products, which require effective management of profitability [7]. Profitability in operational MSMEs with new products is an essential element for ensuring the company's sustainability in the future [7]. However, based on the observations conducted, MSME Mahesty faces several constraints, including the absence of detailed cost processing for its Pak Choy vegetable flour product and the lack of a systematic administrative system. As a result, the actual level of profitability generated by the product remains unknown. This issue needs to be investigated, as cost management indicators and proper administrative systems are essential aspects in assessing business performance and determining its sustainability [8]. Several study-related analyses of profitability agroindustry have been done previously like Profitability of Tempe Home Industry in Processing Soybeans in Bandar Lampung [9]; Calculation of Break Even Point (BEP) and Margin of Safety (MOS) as Profit Planning Tools at MSME Makroni NR Ciamis [10]; Analysis Feasibility and Profitability of Chips Agroindustry in Mane Tunong Village Muata Batu District, North Aceh Regency [11]; Analysis of Added Value and Profitability of Processing Business Mackerel Fish Crackers In North Pulau Laut District, North Lombok Regency, New Town [8].

Based on this background, the researcher raised the topic "Profitability Analysis of Pakcoy Vegetable Flour at Mahesty MSME in Malang City." Several previous studies have analyzed the profitability of various processed food products, including the profitability of broccoli chips and chili chips [12], and the profitability of cassava processing [13]. Research related to pak choy has also been conducted, including nutritional quality of pakcoy by providing red and blue light [14], pak choy growth [15], added value and marketing strategies of pak choy chips [16], acceptance of pak choy chips [17], the character of volatile compounds in pak choy [18] and the added value of pak choy flour [19]. Additionally, studies have been conducted on other vegetable powders and flours, such as artichoke flour as a processed ingredient [20], a comparative analysis of vegetable flours [21], and utilization of porang flour [22].

From these various studies, it can be concluded that no study has specifically analysed the profitability of pak choy vegetable flour. Therefore, the novelty of this research lies in

the profitability analysis of pak choy vegetable flour products produced by the Mahesty MSME in Malang City. The results of this study are expected to provide a strategic basis for Mahesty MSME to increase revenue and support business sustainability.

2 **Research Methods**

This study was conducted at MSME Mahesty, located in the Blimbing District of Malang City, with data collection carried out from January to February 2025. The study location was selected based on the fact that the Pak Choy vegetable flour product was newly launched in 2023 and, until now, has not been further researched in terms of its profitability. The respondent in this study is the owner of MSME Mahesty, who also acts as the key informant. The data collection for the profitability analysis used a purposive sampling method.

This study employs a descriptive, quantitative, and qualitative approach. The qualitative approach is used to understand the profile of MSME Mahesty, and its production activities, and to provide an in-depth description of the Pak Choy vegetable flour product. The quantitative approach involves numerical analysis to calculate the profitability of the Pak Choy vegetable flour product. The data sources used in this study consist of both primary and secondary data.

Profitability analysis uses several approaches costs, revenue, and profit, RC Ratio [23], Break Event Point (BEP), Margin of Safety (MOS), and Marginal Income Ratio (MIR) [10]. The formula used to count profitability is as follows.

2.1 *Cost, Profit and Revenue Analysis, RC Ratio*

The cost is the sacrifices made to produce a product and is assessed in IDR [24] units. Costs can be divided into two types: fixed costs and variable costs. The combination of fixed costs and variable costs is referred to as the total cost, which encompasses all expenses incurred during the production process to manufacture a product. The following formulas are used to calculate fixed costs, variable costs, and total costs according to [13].

1. Fixed Costs
- Calculate fixed costs using the formula in equation (1), where TFC is total fixed costs (IDR), Xi: is the physical amount of inputs that form fixed costs for production, Pxi: is input or material prices (IDR), and N: is the amount or quantity of inputs.

$$TFC = \sum_{i=1}^n x_i \cdot P_{x_i}$$

(1)

- Calculating fixed costs also requires knowing the depreciation costs of the production equipment used. The method used to calculate depreciation is the straight-line depreciation method (Straight Line Depreciation Method). As for calculating depreciation using the formula in equation (2), where AD: is depreciation (IDR), P: is initial cost (IDR), S: is residual value (IDR), and N: is economic life (years).

$$AD = 1/N (PS)$$

(2)

2. Variable Costs
- Calculate variable cost using the formula in equation (3) where VC: is variable cost/ variable cost (IDR) and TVC: is total variable cost/ amount of variable cost (IDR).

$$TVC = \sum_{i=1}^n VC$$

(3)

3. Total Cost
- To calculate the total cost using the formula in equation (4) where TC: is the total cost of product processing (IDR), TFC: is the total fixed cost of the product (IDR), and TVC: is the total variable cost of the product (IDR).

$$TC = TFC + TVC$$

(4)

4. Revenue

According to [13], to calculate revenue using the formula in equation (5), where TR: is the total revenue of MSME, P: is the product price (IDR/unit) and Q: is the amount of production (units).

$$TR = P \times Q \quad (5)$$

5. Profit

Net profit is obtained from the difference between revenue and total cost. As for calculating the profit using the formula in equation (6) where Pd: is net income of MSME, TR: is total income of MSME, and TC: is total production costs.

$$Pd = TR - TC \quad (6)$$

6. R/C Ratio

The formula used to calculate the RC Ratio according to [13] is in equation (7) where TR is: the total income of pak choy vegetable flour, and TC: is the total cost of pak choy vegetable flour.

$$R/C \text{ Ratio} = TR/TC \quad (7)$$

The conclusion can be drawn by interpreting the magnitude of the R/C Ratio value. The criteria are based on [25] as follows:

- If $R/C > 1$, then business agroindustry processing is profitable for attempt.
- If $R/C < 1$, then business agroindustry processing is not worth attempting (at a loss).
- If $R/C = 1$, then business agroindustry processing in position No profit and loss (achieve the break-even point)

2.2 Analysis Profitability

1. BEP (Break Event Point)

[26]. In addition, the BEP calculation is used to determine the amount of profit margin and the point at which the capital invested is returned in the production process [27]. The following are the formulas to calculate BEP in units and IDR, according to [28].

- BEP unit

$$\begin{aligned} TR &= TC \\ PQ &= TFC + TVC \\ PQ &= TFC + AVC.Q \\ Q(P-AVC) &= TFC/(P-AVC) \\ BEP(\text{unit}) &= TFC/(P-AVC) \end{aligned} \quad (8)$$

- BEP IDR

$$\begin{aligned} Q &= TFC/(P-AVC) \\ QP &= (TFC/(P-AVC)) \times P \\ QP &= ((TFC.P)/(P-AVC)) \\ QP &= (TFC/((P-AVC)/P)) \\ QP &= (TFC/(P/P-AVC/P)) \\ QP &= (TFC/(1-AVC/P)) \\ BEP(\text{IDR}) &= (TFC/(1-AVC/P)) \end{aligned} \quad (9)$$

Criteria for making a decision [28]:

- If the result sales $>$ BEP IDR, then business is profitable.
- If the result sales $<$ BEP IDR, then the business loses.
- If capacity production $>$ BEP units, then the business is profitable.
- If capacity production $<$ BEP units, then the business loses.

2. Marginal Income Ratio (MIR)

Marginal Income Ratio (MIR), or contribution margin, is the ratio between income and sales. MIR provides information on how much of the sales revenue is available to cover fixed costs and generate profit. According to Mulyadi 2015 in [11], it can be formulated In nominal or percentage form, as in equations (10) and (11), where MIR: is marginal income ratio (%) and TR: is total income per month of production (IDR).

MIR (IDR)= TR-TVC (10)

MIR (%) = (TR-TVC)/TR X 100% (11)

The higher the MIR value obtained by a company, the better its financial condition, as it indicates that the company can cover its fixed costs. This means that the MIR value should be higher than the fixed cost threshold [11].

3. Margin Of Safety (MOS)

Margin of Safety (MOS) refers to the condition in which a company has a safety buffer to avoid losses in the event of a decline in sales. The MOS value is influenced by the level of sales and the break-even point of the business. The higher the MOS, the better the company is at withstanding a decrease in sales. The following is the formula for MOS, which can be formulated in nominal or percentage terms (Darsono 2009 in [10]) as in equations (12) and (13) where MOS: is the margin of safety (%), TR: is total revenue per month of production, and BEP: is the break-even point (IDR).

MOS (IDR) = TR – BEP (IDR) (12)

MOS (%) = (TR-BEP)/TR X 100% (13)

According to [10], The Margin of Safety (MOS) value can be interpreted as follows: if MOS > 20%, the company is in a safe condition and not at risk. If MOS < 20%, the company is in a vulnerable condition and approaching the break-even point. If MOS < 0, it indicates that the company is in a critical condition and is experiencing a loss.

4. Profitability

If the Margin of Safety (MOS) and Marginal Income Ratio (MIR) values are known, the amount of profitability can be calculated using the formula in equation (14). According to Mulyadi 2001 in [29], where π : is the profitability of the product (%), MOS: is the margin of safety (%), and MIR: is the Marginal Income Ratio (%)

π (%) = MIR x MOS (14)

Profitability value > 20% then the business is run profitably or gets profit [29].

3 Results and Discussion

3.1 Analysis Profitability

3.1.1 Cost, Revenue and Profit Analysis, RC Ratio

1. Fixed Costs

Fixed costs are expenses that do not change, even when there is a change in production volume, whether production is high or low [30]. he components of fixed costs include equipment depreciation, investment in production facilities, electricity costs, and others. The fixed costs for the Pak Choy vegetable flour product are presented in **Table 1**.

Table 1. Breakdown of Fixed Costs for Pak Choy Vegetable Flour Production (per day)

No	Description	Unit (day)	Cost
1.	Getra 16 tray dehydrator	2	IDR 13,333.33
2.	Philips Blender	1	IDR 1,111.11

3.	Sieve	1	IDR 277.78
4.	Sealer	1	IDR 555.56
5.	Large container	2	IDR 555.56
6.	Stainless steel wash basin	1	IDR 138.89
7.	Knife	1	IDR 462.96
8.	UPHOME digital scales	1	IDR 152.78
9.	Spoon	1	IDR 92.59
Total			IDR 16,680.56

Source: Primary Data Processed 2025

The depreciation cost of equipment used in the production of Pak Choy vegetable flour is calculated based on the usage and estimated service life of each tool. Based on Table 1, the total depreciation cost of the production equipment amounts to IDR 16,680.56.

The calculation of equipment depreciation costs in the production of Pak Choy vegetable flour is included in the fixed expenses incurred by the company on a daily, monthly, or even yearly basis during production activities. In addition to equipment depreciation, other operational costs include electricity, building rent, water, machinery maintenance, and transportation to support the production process [31]. The price fixed issued by MSME Mahesty in producing flour, vegetable Pak Choy can seen in **Table 2**.

Table 2. Summary of Fixed Costs for Pak Choy Vegetable Flour Production

No	Pak Choy Vegetable Flour Fixed Cost / Production	
	Description	Cost (IDR)
1.	Electricity cost	IDR 3,333.33
2.	Rental costs building	IDR 27,777.78
3.	Water charges	IDR 833.33
4.	Depreciation expense	IDR 16,680.56
5.	Maintenance costs machine	IDR 5,000
6.	Transportation costs	IDR 20,000
Total		IDR 73,625

Source: Primary Data Processed 2025

The table shows that the total fixed costs for processing Pak Choy vegetable flour in one production cycle amount to IDR 73,625. The fixed costs in the production of Pak Choy vegetable flour consist of electricity costs, building rent, water costs, equipment depreciation, machine maintenance costs, and transportation costs.

2. Variable Costs

Variable costs are costs that change proportionally with the number of units produced [28]. The greater the production volume, the higher the variable costs incurred, and vice versa. Variable costs consist of raw materials, additional materials, labor wages, and others. Below is the variable cost for producing Pak Choy vegetable flour.

Table 3. Variable Cost of Production Flour Pak Choy (Per production)

Variable Cost of Production Flour Pak Choy (Per production)					
No	Description	Amount / Production	Unit	Price (IDR/Unit)	Total cost (IDR)
Raw material					
1.	Pak Choy Vegetables Organic	30	Kg	IDR 22,000	IDR 660,000
Auxiliary Materials					
1.	Packaging	20	Unit	IDR 3,000	IDR 60,000
2	Labor	2	Person	IDR 100,000	IDR 200,000

Total	IDR 128,000	IDR 920,000
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Source: Primary Data Processed 2025

Based on Table 3 shows that the cost of the variables that are issued in the production process of flour vegetable Pak Choy per production amounts to IDR 920,000.00.

3. Total Cost

Total cost is the overall expenses incurred by a person's business in the production process [12] the total production cost consists of fixed costs and variable costs. Total costs play an essential role in calculating the cost of production, which then influences the determination of the product's selling price in the market. The total cost of producing Pak Choy vegetable flour is presented in **Table 4**.

Table 4. Total Production Cost of Pak Choy Flour

Total Cost		
No	Description	Amount
1.	Fixed costs	IDR 73,625
2.	Variable costs	IDR 920,000
Total		IDR 993,625

Source: Primary Data Processed 2025

Based on the table, the total production cost, which is the sum of fixed and variable costs incurred by MSME Mahesty to produce Pak Choy vegetable flour, amounts to IDR 993,625 per production cycle.

4. Revenue and Profit

Gross revenue is the total income obtained from sales, calculated by multiplying the number of units sold by the selling price per unit. Meanwhile, profit is the difference between total revenue and total costs incurred in the production process. The revenue and profit received by MSME Mahesty from the sale of Pak Choy vegetable flour are presented in **Table 5**.

Table 5. Profit Analysis of Pak Choy Vegetable Flour Production

No	Pak Choy Vegetable Flour	
	Description	Total
1.	Acceptance (TR)	IDR 1,500,000
2.	Total Cost (TC)	IDR 993,625
3.	Profit (TR-TC)	IDR 506,375

Source: Primary Data Processed 2025

Based on the table, revenue from the sale of Pak Choy vegetable flour amounts to IDR 1,500,000. This revenue is obtained by multiplying the product price by the quantity produced in one production cycle. Meanwhile, the total costs incurred by the company amount to IDR 993,625. Therefore, the income earned by the company from producing Pak Choy vegetable flour is IDR 506,375. Based on this figure, it can be concluded that the company is experiencing a profit.

5. RC Ratio

Revenue/Cost (R/C) ratio is an analysis used to determine the relative profitability of a business. The R/C ratio is calculated by comparing revenue with the production costs incurred. The R/C ratio for Pak Choy vegetable flour is presented in **Table 6**.

Table 6. Revenue–Cost Ratio of Pak Choy Vegetable Flour Production

No	Revenue	Total cost	Revenue per production
1	IDR 1,500,000	IDR 993,375	1.51

Source: Primary Data Processed 2025

According to the table, the R/C ratio for the Pak Choy vegetable flour business is 1.51, indicating that the production is profitable and worth continuing.

3.1.2 *Analysis Profitability*

Profitability analysis refers to the evaluation of a company's capability to generate profits, which is influenced by production costs, selling prices, and sales volume [9] This analysis can be conducted using Break Even Point (BEP), Margin of Safety (MOS), and Marginal Income Ratio (MIR) calculations, as outlined in [8].

1. *BEP (Break Even Point)*

The Break Even Point (BEP) is a condition in which MSME Mahesty neither gains profit nor incurs a loss from the sale of Pak Choy vegetable flour. At this point, total revenue is equal to total costs, meaning that income is just enough to cover expenses [32]. In this study, the production of Pak Choy vegetable flour resulted in a profit of IDR 506,375. The BEP is calculated in two forms: BEP in units and BEP in currency (idr). The BEP values were obtained using equations (8) and (9) as follows.

Table 7. Break Even Point (BEP) Analysis of Pak Choy Vegetable Flour Production

Break Event Point	
Description	Amount (IDR)
TFC	IDR 73,625
TVC	IDR 920,000
Q	1
P	IDR 1,500,000
AVC = TVC/Q	IDR 920,000
BEP unit	0.127
BEP IDR	IDR 190,409.48

Source: Primary Data Processed 2025

Based on the results in Table 7, the BEP calculation shows that MSME Mahesty must produce at least 0.127 kg (127 grams) of Pak Choy vegetable flour, with a minimum income of IDR 190,409.48 per production cycle. This amount represents the minimum revenue required to avoid a loss. When compared to the actual conditions, the production of Pak Choy vegetable flour exceeds the break-even point, as the business can sell up to 1 kg or 20 units of product per production cycle, generating revenue of IDR 1,500,000. This indicates that Mahety's MSME is in a profitable business position, as its actual production volume far exceeds the break-even point. Therefore, if the company can maintain or expand its production capacity, there's still ample opportunity to increase its profit margin.

2. *MIR (Marginal Income Ratio)*

A business's ability to cover fixed costs and generate profit can be assessed through the Marginal Income Ratio (MIR) calculation. MIR represents the proportion of the difference between Total Variable Cost (TVC) and Total Revenue. The following is the MIR calculation for Pak Choy vegetable flour products using the following equations (10) and (11).

Based on the calculation, the obtained MIR value is 38.67%. This indicates that each production cycle of Pak Choy vegetable flour contributes 38.67%, or approximately IDR 580,000.00, from its sales revenue to cover fixed costs and generate profit. This value reflects a business's ability to maintain operational sustainability despite fluctuations in sales volume. The higher the MIR value, the better the financial condition of the company [8]. Therefore, MIR can be used as an essential indicator for businesses to evaluate their efficiency and develop strategies to increase profitability.

3. MOS (Margin of Safety)

The sales results of Pak Choy vegetable flour at the BEP level, when compared with actual sales, can provide information on how much sales can decline before the business incurs a loss. This is known as the Margin of Safety (MOS). MOS is determined by the difference between total actual sales and the BEP value in IDR. The following is the MOS calculation for Pak Choy vegetable flour using the appropriate equations (12) and (13).

Based on the calculation results, the Margin of Safety (MOS) value for Pak Choy vegetable flour is 87.31%. This indicates that sales can decline by up to 87.31% of the actual sales value without causing the business to incur a loss. In other words, sales of Pak Choy vegetable flour should not fall below 0.127 kg or approximately IDR 190,409.48. With a relatively high MOS value, the business is highly resilient to the risk of declining sales.

4. Profitability

The results of the MIR and MOS calculations can be used to assess the company's ability to generate profit, also known as the business profitability level. The level of business profitability can be calculated by multiplying the MIR and MOS values. The results of the MIR and MOS calculations for the processing of Pak Choy vegetable flour, using Equation (14) are presented in the following table.

Table 8. Profitability Analysis of Pak Choy Vegetable Flour Production

Profitability		
No	Description	Amount (IDR)
1.	BEP IDR	IDR 190,409.48
2.	Total Revenue	IDR 1,500,000.00
3.	TVC	IDR 920,000.00
4.	MIR (TR-TVC) (IDR)	IDR 580,000.00
5.	MIR (TR-TVC)/(TR) %	38.67%
6.	MOS (TR- BEP) (IDR)	IDR 1,309,590.52
7.	MOS (TR-BEP)/(TR) %	87.31%
8.	PROFITABILITY (MIR% x MOS%)	33.76%

Source: Primary Data Processed 2025

The level of profitability obtained by MSME Mahesty in producing Pak Choy vegetable flour is 33.76%. This indicates that if the company can sell all of its production, the profit earned will amount to 33.76%. Therefore, based on the previously calculated profitability value, MSME Mahesty Pak Choy vegetable flour business has achieved a high level of profitability, as it exceeds 20%. This means the company is capable of covering its production costs and generating profit [11]. The greater the profitability percentage, the higher the profit a business can generate [11]. The results of this study can be compared with those of [17] on the pak choy chip business in the Flamboyan Garden Group, Bandung. The study demonstrated a high added value of IDR 452,375/kg, with a value-added ratio of 90.5%, and a profit margin of IDR 227,375/kg, or 45.4%. Furthermore, the results of a profitability study [12] on the Agronusa Mushroom MSME in Batu City showed that broccoli chips reached 44.07% profitability, while chili chips had a profitability of 29.76%. These findings reinforce that various diversified processed vegetable products, including pak choy

flour, pak choy chips, broccoli chips, and chili chips, all have high profitability potential and can support agro-industry development based on local vegetable commodities.

4 Conclusion

The Marginal Income Ratio (MIR) of 38.67% indicates that each production cycle of Pak Choy vegetable flour contributes 38.67% of its sales revenue, or approximately IDR 580,000.00, to cover fixed costs and generate profit. Meanwhile, the Margin of Safety (MOS) of 87.31% shows that sales for MSME Mahesty Pak Choy vegetable flour business can decline by up to 87.31% from actual sales without causing a loss. Therefore, the profitability level of Pak Choy vegetable flour products obtained by MSME Mahesty is 33.76%. This means that if the business can sell all of its production, it will achieve a profit of 33.76%. MSME Mahesty Pak Choy vegetable flour processing has reached a high level of profitability since it exceeds 20%, indicating that the company can cover its production costs and generate profit.

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