JALOW
Journal of Agribusiness and Local Wisdom

ANALYSIS OF PRODUCTION COST OF TEMPE USING THE FULL COSTING METHOD IN TEMPE ASLI HB JAMBI AGROINDUSTRY

Adinda Rahmi Fauziah[1], Yusma Damayanti [2], Dewi Sri Nurchaini [2]
[1] Student of Agribusiness Department, Faculty of Agriculture, Jambi University, Indonesia
[2] Agribusiness Department, Faculty of Agriculture, Jambi University, Indonesia
ORCIDs:
Adinda Rahmi Fauziah : http://orcid.org/11394928923-121212
Yusma Damayanti : http://orcid.org/8y8ihe973197391371
Dewi Sri Nurchaini : http://orcid.org/kksnksdksjdoi0ei00e
* Corresponding author email: adindarahamifauziaah@gmail.com

ABSTRACT

This research aims to: 1) Describe the overview of the Asli HB Jambi tempe agroindustry, 2) Analyze the calculation of tempe production costs based on the agroindustry and the full costing method, 3) Analyze the selling price of tempe based on the agroindustry and the cost lus Pricing method, 4) Analyze the impact of imported soybean price fluctuations on the cost of tempe production at Asli HB Jambi. The analytical method used is quantitative descriptive analysis, with full costing calculation, cost plus pricing, and paired t-test analysis as the analytical tools. Based on the analysis, the results are: 1) The Asli HB Jambi tempe agroindustry is a small-scale individual industry producing 250 gram packaged tempe, processing an average of 1,092 kg of soybeans per cycle. Marketing is done through three channels: a) agroindustry-consumer, b) agroindustry-reseller-consumer, c) agroindustry-sales-reseller-consumer. 2) The production cost per 250 grams is IDR 2,358.68 based on agroindustry calculations and IDR 2,409.59 using the Full Costing method. After marketing adjustments, the Full Costing production cost rises to IDR 2,471.34 due to unsold tempe returns. 3) The agroindustry's selling prices are IDR 4,500 (Channel I), IDR 4,000 (Channel II), and IDR 3,500 (Channel III), while the Cost Plus Pricing method results in IDR 4,631, IDR 4,149, and IDR 3,667, respectively. 4) A 10% change in imported soybean prices significantly affects production costs, increasing to IDR 2,602.66 when imported soybean prices rise and decreasing to IDR 2,216.53 when imported soybean prices fall.

Article Info
Published: 04/08/2025

Keywords: Cost_Plus_Pricing, Cost_of_Production, Full_Costing, Selling_Price.

INTRODUCTION

Tempe is a soybean-based processed product with high protein content and is accessible to various social groups. Based on data on the average per capita weekly consumption of soybean-based processed foods in Jambi Province, tempe is the most preferred soybean-based food in the province, with a consumption rate of 0.109 kg (BPS, 2023). Jambi City is one of the centers of the tempe agroindustry in Jambi Province, with a total of 81 tempe agroindustries (Jambi Province Industry Office, 2023). Among these, Asli HB Jambi is the only one tempe agroindustry under the guidance of the Forum Komunikasi Doa Bangsa (FKDB), an organization that has fostered tempe agroindustries across multiple provinces in Indonesia.

The sustainability of small-scale agroindustries like Asli HB Jambi depends significantly on accurate cost calculations. The continuous increase in imported soybean prices and the lack of proper cost calculation methods may threaten the sustainability of small-scale tempe agroindustries, potentially leading to reduced profit margins or even business closures. Micro and small enteIDRrises often struggle with determining the correct cost of production and selling prices, leading to financial instability (Mulyani *et al*., 2021). Despite being a guided agroindustry, Asli HB Jambi still relies on a simple cost calculation method that only considers specific cost components, without a

comprehensive evaluation of total production costs. This lack of detailed cost calculation results in uncertainty regarding the actual production cost, making it difficult to set an optimal selling price

One of the key cost components in production is raw materials. The primary raw material used in Asli HB Jambi tempe production is imported soybeans. According to data from the Jambi Province Trade Office (2023), the price of imported soybeans in Jambi City has shown an increasing trend annually. The most significant price surge occurred between 2021 and 2022, with an 18.05% increase, from an average price of IDR 10,286/kg in 2021 to IDR 12,143/kg in 2022. This price fluctuation has made it increasingly difficult for small agroindustries to determi ne accurate production costs and adjust their selling prices accordingly.

Various costing methods, such as variable costing and activity-based costing (ABC), have been applied in different industries. However, for small-scale agroindustries like Asli HB Jambi, the full costing method provides a more comprehensive approach by considering all production costs, including raw material costs, direct labor costs, and both fixed and variable factory overhead costs (Mulyadi, 2014). Meanwhile, the cost plus pricing method ensures that all production costs are accounted for, along with a desired markup percentage to establish a competitive yet profitable selling price. These methods allow for a more precise calculation of the cost and an optimized pricing strategy.

This research aims to analyze the cost of tempe production at Asli HB Jambi using the full costing method and determine the selling price using the cost plus pricing method. Additionally, this study forecasts the production cost adjustments required when the price of imported soybeans increases or decreases by 10%, a crucial aspect that has been largely overlooked in previous research. By providing a more comprehensive approach to cost analysis and pricing strategy, this study aims to offer practical insights for guided agroindustries in ensuring cost stability and business sustainability.

RESEARCH METHOD

This research was conducted at the Asli HB Jambi tempe agroindustry, located in Kampung Baru, Legok Subdistrict, Telanaipura District, Jambi City. The selection of the Asli HB Jambi tempe agroindustry was carried out puIDRosively, considering that it is the only tempe agroindustry in Jambi City under the guidance of FKDB. It is also the newest among other tempe agroindustries in Jambi City, having been established in 2016, and it continues to operate consistently. This research was conducted from January 2024 to February 2024. The research data were obtained from primary sources collected directly from the Asli HB Jambi, while secondary data were sourced from books, journals, relevant articles, and previous studies. Data collection was carried out through observation, interviews, and literature studies.

The analytical method used in this study is a descriptive quantitative method. The descriptive method is applied to explain the general overview of the agroindustry, while the quantitative method is used to analyze the cost of production and the selling price of tempe. To statistically determine the significant differences in the cost of production before and after a 10% increase in imported soybean prices, as well as before and after a 10% decrease in imported soybean prices, data analysis was performed using SPSS (Statistical Program for Social Science) version 23.

The calculation of the tempe production cost follows the *full costing* method according to Mulyadi (2014), as outlined below:

Table 1. Production cost

Cost Elements	Total
Raw Material Costs	IDR xxx
Direct Labor Costs	IDR xxx
Factory Overhead Costs	IDR xxx
Cost of Production	IDR xxx

The calculation of tempe's selling price uses the cost plus pricing method according to Mulyadi (2001) as follows:

Selling Price = Cost of Production + (% Mark-up × Cost of Production)

$$\% \textit{ Mark Up} = \frac{\text{(Expected Profit) + (Total Marketing and Administrative Cost)}}{\text{Production Costs}}$$

RESULTS AND DISCUSSION

Overview of the Asli HB Jambi Tempe Agroindustry

The Asli HB Jambi tempe agroindustry is a small-scale, sole proprietorship under FKDB's guidance, established in 2016, producing 250-gram packaged tempe. The business operates with self-funded capital, owning fixed assets such as production equipment and machinery, while non-fixed assets include raw materials, packaging, and firewood. The agroindustry has business liabilities, mainly for purchasing imported soybeans. In January 2024, production occurred 30 times, yielding 200,227 tempe packages, with an average of 1,092 kg of soybeans processed per cycle, producing around 6,674 packages per cycle. However, Sunday production is lower, at only 1,000–1,050 kg, due to decreased sales caused by community events such as weddings and religious gatherings. The production process takes 8–9 hours daily and involves soaking, boiling, grinding, washing, drying, inoculating, packaging, and fermenting soybeans for two days. Tempe is marketed through three distribution channels, as illustrated in Figure 1.

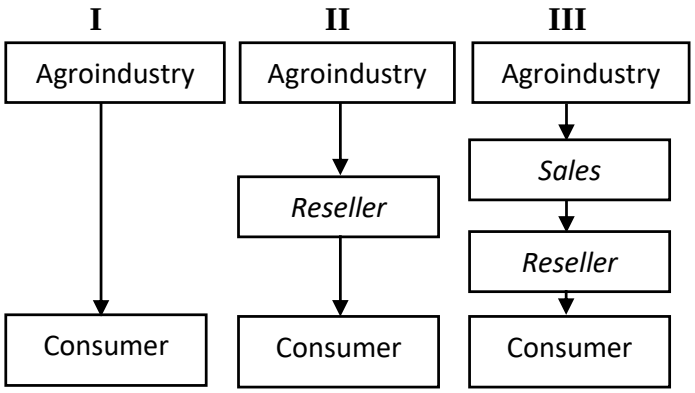

Figure 1. Distribution Channels of Asli HB Jambi Tempe

Based on Figure 1, tempe is marketed through three distribution channels. The total tempe production and sales in January 2024 amounted to 200,227 packages and 195,224 packages, respectively. Sales through Channel I accounted for 457 packages or 0.23% of total sales. This channel had the lowest sales due to its limited market reach. Sales through Channel II reached 74,252 packages or 38.03% of total sales. Meanwhile, Channel III recorded the highest sales, with 120,515 packages or 61.74% of total sales. Channel III is the longest distribution channel compared to the others. While longer distribution chains result in lower profit margins for the agroindustry, the advantage of this channel is its ability to expand the market reach and facilitate faster sales of Asli HB tempe.

Tempe Cost of Production

The cost of production includes all expenses incurred in processing raw materials into finished products. These expenses consist of raw material costs, labor costs, and both fixed and variable factory overhead costs. The calculation of production costs is based on both the agroindustry's own method and cost accounting theory using the full costing method. Asli HB Jambi's agroindustry has so far not accounted for all production costs, focusing only on specific expenses such as raw materials, labor, packaging, and firewood. In contrast, the full costing method considers all costs involved in the production process, including raw materials, labor, fixed factory overhead, and variable factory overhead. A comparison of production costs between the agroindustry method and the full costing method is presented in Table 2.

Table 2. Calculation of Tempe Cost of Production for the Period of January 2024

Cost Elements	Agroindustry Method	Full Costing Method
Raw Material Costs		
Soybeans	386.568.000	386.568.000
Tempe Yeast	1.513.512	1.513.512
Labor Costs		
Wet Production	21.000.000	21.000.000
Dry Production	18.000.000	18.000.000
Factory Overhead Costs		
Packaging	35.440.179	35.440.179
Firewood	9.750.000	9.750.000
Electricity	-	1.440.000
Water	-	5.010.000
House Rental	-	1.500.000
Equipment Maintenance & Repair	-	900.000
Depreciation of Production Equipment	-	1.344.125
Total Production Cost	IDR 472.271.691	IDR 482.465.816
Total Production (250g packs)	200.227	200.227
Cost of Production per 250g	IDR 2.358,68	IDR 2.409,59

Source: Processed Data, (February 2024)

Based on Table 2, the calculation of the cost of production using the agroindustry method and the full costing method shows a difference of IDR 50.91. with the full costing method being 2.16% higher. This discrepancy arises because the agroindustry method does not account for all production costs. Expenses such as water and electricity are excluded, as the calculation is still based on the initial assumption that the production house and the owner's residence are the same. Additionally, depreciation and maintenance costs are not considered due to the owner's limited knowledge. This finding aligns with research by Faradela *et al.* (2022), which found that companies using their own costing methods often underestimate production costs compared to the full costing method due to incomplete cost identification.

After the marketing process, 5,003 tempe packages remained unsold, leading to a loss of IDR 12,055,179. These costs cannot be recovered as the unsold tempe is consumed privately. To prevent profit reduction, the cost of unsold tempe should be incoIDRorated into the production cost and distributed among the 195,224 sold packages. As a result, the additional cost burden per package should be IDR 61.75, calculated systematically as follows:

HPP Adjustment = HPP + Cost of Unsold Tempe Production
= IDR 2,409.59 + IDR 61.75
= IDR 2,471.34

The adjusted cost of production using the full costing method after the marketing process is higher. To reduce the increased cost of production, the risk of unsold tempe must be minimized. One way to prevent excessive unsold tempe is to avoid oveIDRroduction. The agroindustry should also consider the availability of similar-sized tempe wrapped in banana leaves in the market. Some consumers prefer banana leaf-wrapped tempe due to its distinct taste and aroma, as well as its perception of being healthier and more environmentally friendly.

Selling Price of Tempe

The selling price of a product must cover all production costs and generate profit to ensure business sustainability. The Asli HB tempe agroindustry has not yet accurately determined the selling price of its tempe. The pricing strategy considers market conditions to remain competitive, as the market structure tends to resemble perfect competition (Muslimatun *et al.*, 2016). Consequently, Asli HB Jambi tempe follows market prices. Cost-plus pricing is a method used to set selling prices by adding the desired profit margin to the total production cost (Mulyadi, 2001). Before calculating the selling price, the markup percentage must be determined based on the expected profit and non-

production costs. The expected profit is set by comparing market prices with the production cost. The profit margins for each marketing channel are 90% of production costs for Channel I, 70% for Channel II, and 50% for Channel III. Table 3 presents the non-production costs for January 2024.

Table 3. Non-Production Costs of Agroindustry for the January 2024 Period

Non-Production Costs	Satuan	Kuantitas	Harga (IDR)	Biaya (IDR)
Marketing Costs				
Fuel Costs	Liter	540	10.000	5.400.000
Plastic Bags	*Pack*	400	9.000	3.600.000
Market Levy Fees	-	-	-	1.500.000
Administrative and General Costs				
Mobile Credit	-	-	-	50.000
Stationery	-	-	-	50.000
Total Non-Production Costs				10.600.000
Total Production (250g Packs)				200.227
Non-Production Cost per 250g				52,94

Source: Processed Data (February 2024)

The marketing cost in the Asli HB Jambi tempe agroindustry represents the expenses incurred to deliver tempe to consumers, amounting to IDR 10,500,000. Additionally, administrative and general expenses include phone credit costs of IDR 50,000 and office supplies (ATK) costs of IDR 50,000.

After determining the expected profit margin and non-production costs, the selling price of tempe through various marketing channels can be calculated using the cost plus pricing method, as follows:

1) Selling Price Through Channel I (Consumers)

   %*Markup* Calculation : $\frac{(90\% \; x \; 482.465.816)+10.600.000}{483.465.816} x \; 100\% = 92{,}20\%$

   Selling Price = IDR 2.409,59 + (92,20% x IDR 2.409,59)
   = IDR 2.409,59 + (IDR 2.221,64)
   = IDR 4.631,23 Rounded to IDR 4.631

2) Selling Price Through Channel II (Resellers)

   %*Markup* Calculation: $\frac{(70\% \; x \; 482.465.816)+10.600.000}{482.465.816} x \; 100\% = 72{,}20\%$

   Selling Price = IDR 2.409,59 + (72,20% x IDR 2.409,59)
   = IDR 2.409,59 + (IDR 1.739,72)
   = IDR 4.149,31 Rounded to IDR 4.149

3) Selling Price Through Channel III (Sales)

   %*Markup* Calculation: $\frac{(50\% \; x \; 482.465.816)+10.600.000}{482.465.816} x \; 100\% = 52{,}20\%$

   Selling Price = IDR 2.409,59 + (52,20% x IDR 2.409,59)
   = IDR 2.409,59 + (IDR 1.257,81)
   = IDR 4.667,40 Rounded to IDR 3.667

Based on the explanation and calculations above, the selling prices using the agroindustry method and the cost plus pricing method can be observed. There are differences in tempe selling prices across various marketing channels of Asli HB Jambi. Table 4 presents a comparison of the selling prices using the agroindustry and cost plus pricing methods.

Table 4. Selling Price of Tempe Using the Agroindustry Method and Cost Plus Pricing Method

Marketing Channel	Selling Price (IDR/250 Gr)		Difference in Selling Price (IDR/250 Gr)
	Agroindustry	*Cost Plus Pricing*	
Channel I (Consumers)	4.500	4.631	131
Channel II (Resellers)	4.000	4.149	149
Channel III (Sales)	3.500	3.667	167

Source: Processed Data (February 2024)

Table 4 shows that the selling price of tempe set by Asli HB Jambi Agroindustry differs from the price calculated using the cost plus pricing method. The agroindustry determines its selling price based on market mechanisms, where prices are influenced by supply and demand. Therefore, the selling price must be adjusted according to market conditions. The selling price calculated using cost plus pricing is higher than the agroindustry's pricing method. Specifically, the selling price for consumers is 2.91% higher, for resellers 3.725% higher, and for sales 4.77% higher. The cost plus pricing method includes non-production costs. This finding aligns with Hasyim (2018), which states that selling prices calculated using cost plus pricing tend to be higher than company-determined prices. This is because cost plus pricing is based on the full costing method, which accounts for all production expenses, whereas the agroindustry's pricing does not fully detail production and non-production costs.

Impact of Imported Soybean Price Changes on Tempe Production Costs

The primary raw material used by the agroindustry is imported soybeans. Changes in soybean prices directly impact tempe production costs, as soybeans account for the largest percentage of total costs (Murwanti & Sholahuddin, 2022). This study simulates the full costing production cost method by modeling a 10% increase and decrease in imported soybean prices. In January 2024, the soybean price was IDR 11,800. After simulation, a 10% increase resulted in a price of IDR 12,980, while a 10% decrease brought it to IDR 10,620. Table 5 presents a comparison of tempe production costs before and after these price changes.

Table 5. Comparison of Tempe Production Costs Using the Full Costing Method Before and After a 10% Increase and Decrease in Imported Soybean Prices

Cost Elements	Before Simulation	After 10% Increase in Soybean Price	After 10% Decrease in Soybean Price
Raw Material Costs			
Imported Soybeans	386.568.000	425.224.800	347.911.200
Tempe Yeast	1.513.512	1.513.512	1.513.512
Labor Costs			
Wet Production	21.000.000	21.000.000	21.000.000
Dry Production	18.000.000	18.000.000	18.000.000
Overhead Costs			
Packaging	35.440.179	35.440.179	35.440.179
Firewood	9.750.000	9.750.000	9.750.000
Electricity	1.440.000	1.440.000	1.440.000
Water	5.010.000	5.010.000	5.010.000
House Rental	1.500.000	1.500.000	1.500.000
Equipment Maintenance	900.000	900.000	900.000
Equipment Depreciation	1.344.125	1.344.125	1.344.125
Total Production Cost	482.465.816	521.122.616	443.809.016
Production Volume (packs)	200.227	200.227	200.227
Cost of Production/250 gr	IDR 2.409,59	IDR 2.602,66	IDR 2.216,53

Source: Processed Data, (February 2024)

Based on Table 5, changes in soybean prices significantly impact the cost of tempe production. A 10% increase in imported soybean prices raises the production cost by IDR 193.07 or 8.01% from the initial cost. To maintain the original production cost of IDR 2,409.59 despite the price increase, the net weight per tempe package must be reduced to 231.45 grams, a decrease of 18.55 grams. This reduction is intended to minimize consumer attention. This aligns with Maghfiroh (2022) study, which found that producers tend to reduce tempe size while keeping the selling price unchanged when soybean prices rise. Conversely, a 10% decrease in imported soybean prices lowers the production cost by IDR 193.06 or 8.01%. If the agroindustry does not increase the net weight per package, profit margins will rise. Generally, producers avoid increasing net weight to maximize profits.

Comparison of Tempe Production Cost Using Full Costing Method Based on Dependent Sample t-Test

This study also conducted a statistical test using the dependent sample t-test to examine the hypothesis that there is a significant difference in the cost of tempe production before and after a 10% increase in soybean prices. The data tested consisted of 30 tempe production cost values calculated using the full costing method. Table 6 presents the results of the production cost test before and after the 10% increase in soybean prices.

Table 6. Comparison of Tempe Production Cost Before and After a 10% Increase in Imported Soybean Prices Using Paired-Samples T-Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Cost of Production of Tempe Before a 10% Increase in Soybean Price - Cost of Production of Tempe After a 10% Increase in Soybean Price	-193,23400	4,43722	,81012	-194,89088	-191,57712	-238,525	29	,000

Source: Processed Data in IBM SPSS 23 (February, 2024)

Based on Table 6, there is a difference in the calculation of the cost of production (HPP) of tempe before and after a 10% increase in the price of imported soybeans, as determined by the paired-sample t-test. According to theory, if the sig (2-tailed) value is < 0.05, it can be concluded that, statistically, there is a significant difference in the cost of production of tempe before and after the 10% increase in the price of imported soybeans.

Additionally, this study also conducted a statistical test using the dependent sample t-test to determine whether there is a significant difference in the cost of production of tempe before and after a 10% decrease in the price of soybeans. Table 7 presents the test results comparing the cost of production of tempe before and after the 10% decrease in soybean prices.

Table 7. Comparison of Tempe Production Cost Before and After a 10% Decrease in Imported Soybean Prices Using Paired-Samples T-Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Cost of Production of Tempe Before a 10% Decrease in Soybean Price	193,23500	4,43850	,81035	191,57764	194,89236	238,457	29	,000

	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
- Cost of Production of Tempe After a 10% Decrease in Soybean Price								

Source: Processed Data in IBM SPSS 23 (February, 2024)

Based on Table 7, there is a difference in the calculation of the cost of production (HPP) of tempe before and after a 10% decrease in the price of imported soybeans, as determined by the paired-sample t-test. According to theory, if the sig (2-tailed) value is < 0.05, it can be concluded that, statistically, there is a significant difference in the cost of production of tempe before and after the 10% decrease in the price of imported soybeans.

CONCLUSION

The Asli HB Jambi tempe agroindustry operates as a small, individually-owned business under FKDB, producing 250-gram packaged tempe. The selling price and cost of production set by the agroindustry are lower than those calculated using the full costing and cost plus pricing methods, leading to inaccurate profit margins. The price of imported soybeans significantly affects the cost of production, with a 10% increase or decrease in soybean prices impacting production costs by 8.01%. To maintain profitability during a 10% soybean price increase, the agroindustry can reduce the tempe package weight by 18.55 grams, while not increasing weight during price decreases will maximize profits.

REFERENCES

Faradela, N., Anggriani, I., & Noviantoro, R. (2022). Analisis Penentuan Harga Pokok Produksi Dengan Metode Full Costing Sebagai Dasar Penetapan Harga Jual Pada Usaha Tempe Makmur Yaya Tebeng Kota Bengkulu. *Jurnal Media Wahana Ekonomika*, *18*(4), 516. https://doi.org/10.31851/jmwe.v18i4.7445

Hasyim, R. (2018). Analisis Penentuan Harga Pokok Produksi Dan Harga Jual Dengan Menggunakan Metode Full Costing Pada Home Industry Khoiriyah Di Taman Sari, Singaraja. *Jurnal Pendidikan Ekonomi Undiksha*, *10*(1), 65. https://doi.org/10.23887/jjpe.v10i1.20057

Maghfiroh, A. W. (2022). Analisis strategi produksi tempe terhadap penyesuaian harga bahan baku. *Seminar Nasional Manajemen, Ekonomi Dan Bisnis*, *7*(1), 548–552.

Mulyadi. (2001). *Akuntansi Manajemen* (Edisi Keti). Salemba Empat.

Mulyadi. (2014). *Akuntansi Biaya*. UPP-STIM YKPN.

Mulyani, S., Gunawan, B., & Nurkamid, M. (2021). Pelatihan Perhitungan Harga Pokok Produksi Bagi UMKM Kabupaten Pati. *Empowerment : Jurnal Pengabdian Masyarakat*, *4*(02), 181–187. https://doi.org/10.25134/empowerment.v4i02.4526

Murwanti, S., & Sholahuddin, M. (2022). Analisis Perilaku dan Strategi Pengrajin Tempe dalam Menghadapi Fluktuasi Harga Kedelai. *Jurnal Sosial Humaniora*, *13*(1), 26–39.

Muslimatun, Siti ; Utami, Dyah Panutun ; Hasanah, U. (2016). Industri Tempe Skala Rumah Tangga. *Surya Agritama*, *5*(2), 88–97.