

STUDY OF ADDED VALUE IN TOFU FLOUR PROCESSED PRODUCTS FROM DIFFERENT SOYBEAN VARIETIES FOR FAMILY FOOD SECURITY

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ABSTRACT

This research aims to determine the income from processing tofu into tofu flour originating from soybeans of the Wilis variety, Baluran variety, and imported varieties in the research area and to analyze the added value obtained from processing tofu into tofu flour for various soybean varieties (local and imported). Data collection was carried out using the Purposive Sampling Method (Deliberately). The research results show that the income obtained from processing tofu into tofu flour from tofu originating from the Wilis variety is IDR. 995,000,-, then tofu from the Baluran variety of soybeans is IDR. 890,000,-, while tofu originating from imported variety soybeans is IDR 1,040,000,-. The added value obtained from processed tofu flour from Wilis variety soybeans is IDR. 54,250-/kg, followed by tofu flour from the Baluran variety amounting to Rp. 51,250-/kg originating from the imported variety amounting to Rp. 39,900/kg. Because the output and raw material prices determine the added value ratio, the value-added ratio obtained for tofu flour from the Wilis variety is 81.27%, the Baluran variety is 80.39%, and the imported variety is 79.16%..

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INTRODUCTION

Value addition enables the increase and stability of agricultural income, the recovery of agricultural primary production, and the improvement of the rural economy (Roy et al., 2013). Improving product productivity, quality, and product development will remain the government's program in the future to improve food security. Unlike rice and corn, soybeans are one of the leading food ingredients. In addition to being used as food, they are also used as raw materials for industry and animals. Therefore, the government continues to encourage the increase of soybean production in response to the increasing demand in the domestic market, but there is no adequate supply (Swastika, 2016). Food security is an essential and strategic matter; experience in countries shows that only a country can develop well after realizing food security first (Suharyanto, 2011). Efforts to improve food security by providing added value to an agricultural commodity are increased by linking agriculture with the processing industry. If agriculture only stops as a cultivation activity (on-farm agribusiness), the added value generated will be relatively small. However, the added value of agriculture will increase if it goes through further processing or activities up to the downstream sector (off-farm agribusiness), which produces various processed products (Triputra, 2011).

An important factor in efforts to increase soybean productivity and production is the application of technological innovation. (Rifda Roswita *et al.*, 2021) Soybeans are one of the main foodstuffs besides rice and corn. In addition to being a food ingredient, soybeans are also used as animal feed and industrial raw materials. In this regard, the government continues to spur increased soybean production in line with the increasing demand for domestic soybeans, which needs to be met with sufficient supply (Suprpto, 2001). Soybeans are one of the agricultural products whose production is relatively high in Indonesia. Soybeans can be processed into traditional foods that are very famous. Namely, they can be processed into tempeh and tofu (Mukhoyaroh, 2015). Soybean is a strategic commodity with high demand; its downstream products are diverse and of high value, including feed, food, energy, and industrial raw materials. As a raw material for production, soybeans are generally produced by small and home industries. This industry can create jobs and increase added value and income through production. Around 88% of soybeans are used to meet the needs of tofu and tempeh processing businesses, while the rest are used by various industries such as soy milk, soy sauce, taco, and tofu flowers.

Research that leads to the nutritional quality of food utilization of soy products is significant and positively impacts public health quality because it examines the importance of soybeans as a functional food (Silvi *et al.*, 2020). Soybeans are food crops that can be processed into various products, such as tempeh and tofu. Soybeans have shrubby stems, with stem heights ranging from 30-100 cm. Each stem can form 3-6 stems. Stem growth is divided into two types, namely determinate and indeterminate types (Wahyuni *et al.*, 2015). The need for soybeans increases yearly with increasing population growth, per capita income, public awareness of nutritional adequacy, and the development of industries that use soybeans as raw materials (Riana & Hardiyanto, 2011).

Tofu agroindustry is a business that utilizes soybean commodity agricultural products, which are then processed in such a way as to produce output in the form of tofu. Many farmers have not adequately processed their agricultural products for various reasons, even though it is realized that this agricultural product processing activity is considered necessary because it can increase added value (Ziraa'ah, 2019). Added value is the increase in the value of a commodity due to processing, transportation, or storage in a production process. After going through the processing process, the selling value of the product becomes higher. In addition, the added value of agriculture is an increase in the physical condition and material value of the agricultural products produced. Increasing the value of raw materials or agricultural products also adds to the product's originality (Akyol, 2018). Agricultural added value refers to the numerical net production reached as a result of the difference between the sum of the outputs in the agricultural sector and that of the inputs (Erdoğan & Aydınbaş, 2021).

One of the product diversification efforts that can be done for tofu is by converting tofu into tofu flour. The advantages of flour are that it is more durable and easy to process. In addition, tofu flour is a source of protein because it comes from the coagulation of soybean protein, so it is suitable for enriching food protein; its use is more flexible, so it is widely open for the needs of the food processing industry. Soybeans greatly influence the characteristics of tofu and flour as the primary ingredient. The variety dramatically influences soybeans' physical and chemical properties and where they grow. In this regard, it is necessary to study the added value of tofu flour from various varieties of soybeans.

RESEARCH METHOD

Data gathering, analysis, sampling, and research area determination are methods. Financial analysis and added value analysis are two types of data analysis methods.

Research Design

The research area was determined purposively or intentionally in the Special Region of Yogyakarta. The research was carried out from November 2023 to January 2024. The research location was chosen because there are tofu companies in Yogyakarta that process tofu into flour, namely in Bantul Regency and Gunung Kidul Regency. This research was conducted in 2 (two) Tofu Flour craftsmen's places, namely the "Hasil Bumiku" Company owned by Mrs. Nanik Yuniarti Kepuh Kulon RT 3 Wirokerten Banguntapan Bantul Special Region of Yogyakarta and the "Putri 21" Company Sambirejo RT 26 Playen, Ngawu Gunung Kidul Special Region of Yogyakarta.

Research Target/Subject

The sampling method was carried out intentionally, namely at two Tofu Flour craftsmen's places: the "Hasil Bumiku" Company owned by Mrs. Nanik Yuniarti Kepuh Kulon RT 3 Wirokerten Banguntapan Bantul Special Region of Yogyakarta and the "Putri 21" Company Sambirejo RT 26 Playen, Ngawu Gunung Kidul Special Region of Yogyakarta.

Research Procedure

The first step in the research process was a field survey of tofu flour entrepreneurs from different soybean varieties. Next, tofu flour craftsmen were interviewed and recorded, and finally, a summary of the data was completed. The data was then subjected to financial and added value analyses.

Instruments, and Data Collection Techniques

The data collected in this study consists of primary and secondary data. Primary data was obtained from direct interviews with respondents using an advanced questionnaire. In contrast, secondary data was obtained from related agencies such as the Department of Industry and Trade, the Food Security Agency, and literature related to this study.

Data analysis technique

In analyzing the tofu processing business, it is necessary to simplify the data so that it is easy to read in tabular form. The data analysis flow can be calculated, displayed, and analyzed using descriptive methods. It can be interpreted using cost analysis, revenue, profit, and simple value-added analysis of the Hayami method.

The making of Business includes Cost analysis in business units that can be done using the Total Cost (TC), Total Revenue (TR), and Profit (Π) formula, according to Sugiarto et al. (2005). Total Cost (TC) is the total cost incurred in producing output:

$$\mathbf{TC = FC + VC}$$

Where :

FC = Fixed Cost / Real Cost

VC = Variable Cost/ Variable Cost.

Total Revenue (TR) is a business's income obtained from the production level multiplied by the price level.

$$TR = P \times Q$$

where :

P = Price / Price.

Q = Quantity/ Amount of Production.

The added value analysis in this study uses the added value analysis method according to the Hayami processing method.

Table 1. Hayami Method Value Added

Variabel	Nilai
I. Output, Input, and Price	
1. Output (kg)	(1)
2. Input (kg)	(2)
3. Labor (HKO)	(3)
4. Conversion Factor	(4) = (1)/(2)
5. Labor Coefficient (HKO/kg)	(5) = (3)/(2)
6. Output Price (Rp)	(6)
7. Labor Wages (Rp/HKO)	(7)
II. Income and Profit	
8. Raw Material Price (Rp/kg)	(8)
9. Other Input Contribution (Rp/kg)	(9)
10. Output Value (Rp/kg)	(10) = (4) x (6)
11. a. Added Value (Rp/kg)	(11a) = (10) – (9) – (8)
b. Added Value Ratio (%)	(11b) = (11a/10) x100%
12. a. Labor Income (Rp/kg)	(12a) = (5) x (7)
b. Labor Share (%)	(12b) = (12a/11a)x100%
13. a. Profit (Rp/kg)	(13a) = 11a – 12a
b. Profit Level (%)	(13b) = (13a/11a)x100%
III. Remuneration for Owners of Production Factors	
14. Margin (Rp/Kg)	(14) = (10) – (8)
a. Direct T. K Income (%)	(14a) = (12a/14) x 100%
b. Other Input Contributions (%)	(14b) = (9/14) x 100%
c. Company Owner's Profit (%)	(14c) = (13a/14) x 100%

Source: Hayami et al., 1987

The criteria for the level of added value ratio, according to Hubeis, 1997 are:

1. The added value is low if the value-added ratio is <15%.
2. The added value is moderate if the value-added ratio is 15% - 49%.
3. If the value-added ratio is >40%, then the added value is high

RESULTS AND DISCUSSION

Respondent Characteristics

A general description of the background of tofu artisans is an essential factor in knowing the characteristics and identities of respondents, where these two tofu craftsmen's businesses can be known for their age, number of dependents, labor used, production capacity and length of time in the tofu processing business. Tofu processing business owners include individual businesses, each in the form of a Trading Business, as shown in Table 2.

Table 2. Tofu Processing Business Profile

Business Name (UD)	Age (th)	Liability (Org)	Labor		Production Capacity/Day (kg)			Length of Business (yrs)
			In the Family (HOK)	Outside the Family (HOK)	Wilis	Baluran	Import	
Hasil Bumiku	55	2	2	3	40	40	40	17
Putri 21	57	1	2	5	20	20	20	15

Source: Processed Primary Data 2023

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From the results above, it can be seen that the tofu craftsmen/managers have a productive age of 55 years and 57 years, with 2 and 1 family dependent, respectively, while the workforce used by the "Hasil Bumi" Company uses two family workers and three outside family workers and has been established for 17 years, while the workforce used by the "Putri 21" Company uses two family workers and five outside family workers, the Company has been established for 15 years. Meanwhile, the Production Capacity produced by the "Hasil Bumi" Company for the Wilis, Baluran, and Import varieties is 40 kg/day. The Production Capacity produced by the "Putri 21" Company for the Wilis, Baluran, and Import varieties is 20 kg/day.

Revenue Analysis

Soekartawi (2006) stated that income (Pd) is the difference between revenue (TR) and all costs (TC). So, $Pd = TR - TC$. Farming income (TR) is the multiplication of production obtained (Y) by the selling price (Py). Farming costs are usually classified into two, namely fixed costs and variable costs. Fixed costs (FC) are relatively fixed in amount and continue to be incurred even though the production obtained is large or small. Variable costs (VC) are costs whose size is influenced by the production obtained, such as labor costs. Total costs (TC) are the sum of fixed costs (FC) and variable costs (VC), so $TC = FC + VC$.

Table 3. Costs and Revenue of Tofu Flour Products from 3 Soybean Varieties (Wilis et al.)

Variables	Formula	Wilis		Baluran		Import	
		Calculation	Mark	Calculation	Mark	Calculation	Mark
Reception	$TR = P \times Q$	75000×40	3000000	73000×40	2920000	75000×40	3000000
Total cost	$TC = TFC + TVC$	1150000	2005000	1150000	2030000	1150000	1960000
		+855000		+880000		+810000	
Income	$\Pi = TR - TC$	$3000000 - 2005000$	995000	$2920000 - 2030000$	890000	$3000000 - 1960000$	1040000

Source: Processed Primary Data (2023)

The study results show that the income of tofu flour obtained from the multiplication of production and price is obtained for the Wilis variety of Rp. 3,000,000, -, Baluran variety of Rp. 2,920,000, and the Import variety of Rp. 3,000,000, -. The total cost of the used Wilis variety is Rp 2005000, the Baluran variety is Rp.2030000 while the Import variety is Rp.1960000,-. From the income obtained (TR) and total cost used (TC), then the income of Rp.995000, income from the Baluran variety of Rp.890000,- and income from an Import variety of Rp.1040000,-. So the highest income is obtained from tofu flour from tofu made from Imported soybeans, followed by tofu made from Wilis soybeans, and the lowest income is from tofu flour from tofu made from Baluran soybeans. This shows that the management of tofu flour from Imported varieties is used more than other varieties; this is also because the price of imported soybeans is lower.

Table 4. Analysis of Added Value of Tofu Flour from Various Soybean Varieties

Variables	Mark	Soybean Varieties		
		Wilis	Baluran	Import
I. Output, Input and Price				
1. Output (kg)	(1)	40	40	40
2. Input (kg)	(2)	44,5	47	55
3. Labor (HKO)	(3)	3	3	3
4. Conversion Factor	$(4) = (1) / (2)$	0.89	0,85	0,72
5. Labor Coefficient (HKO / kg)	$(5) = (3) / (2)$	0,067	0.063	0,05
6. Output Price (Rp)	(6)	75000	75000	70000
7. Labor Wages (Rp / HKO)	(7)	50.000	50.000	50.000
II. Income and Profit				
8. Raw Material Price (Rp / kg)	(8)	10.000	10.000	8.000
9. Other Input Contribution (Rp / kg)	(9)	2.500	2.500	2.500
10. Output Value (Rp / kg)	$(10) = (4) \times (6)$	66.750	63.750	50.400
11. a. Added Value (Rp / kg)	$(11a) = (10) - (9) - (8)$	54.250	51.250	39.900
b. Added Value Ratio (%)	$(11b) = (11a / 10) \times 100\%$	81,27	80,39	79.16
12. a. Labor Income (Rp / kg)	$(12a) = (5) \times (7)$	3350	3150	2500
b. Labor Share (%)	$(12b) = (12a / 11a) \times 100\%$	6.175	6,146	6,26

Variables	Mark	Soybean Varieties		
		Wilis	Baluran	Import
13. a. Profit (Rp / kg)	(13a) = 11a – 12a	50.900	48.100	37.400
b. Profit Level (%)	(13b) = 13a / 11a) x 100%	93.82	93,85	93,73
III. Remuneration for Owners of Production				
Factors		56.750	53.750	42.400
14. Margin (Rp/kg)	(14) = (10) – (8)	5,9	5.8	5,8
a. Direct T. K Income (%)	(14a) = (12a / 14) x 100%	4.4	4.6	5,8
b. Other Input Contributions (%)	(14b) = (9 / 14) x 100%	89,69	89,48	88,2
c. Company Owner's Profit (%)	(14c) = (13a / 14) x 100%			

Source: Processed Primary Data (2023)

Value Added Analysis

Soybeans are the cheapest source of vegetable protein, so unsurprisingly, the total need for soybeans for food reaches 95% of the total need for soybeans in Indonesia. Soybean seeds have a reasonably high utility value because they can be used as food, feed, and industrial raw materials, both on a small and large scale. Food products from soybeans can be divided into two categories, namely, non-fermented and fermented results. Non-fermented results are boiled soybeans, soy powder, soy milk, and tofu. At the same time, fermented results are in the form of tempeh, tauco, and soy sauce (Adisarwanto, 2005).

The tofu processing process in the research area, starting from soaking, grinding, and boiling soybeans to filtering and molding, is a series of agribusiness activities in soybean processing activities, which were previously in the form of grains processed into tofu that is ready for public consumption. Here, a processed product value (tofu flour) or added value to the tofu is created from various soybean varieties (Wilis et al.). Furthermore, the analysis results of the added value generated from processing soybeans (tofu) into Tofu Flour, with Wilis, Baluran, and Import varieties in the research area can be seen in Table 4.

From the table above, it can be seen that the highest output value is tofu flour from the Wilis variety at Rp. 66,750/kg, Baluran variety at Rp. 63,750/kg and Imported variety at Rp. 50,400/kg. The added value obtained from processed tofu flour from Wilis variety soybeans is Rp. 54,250/kg, followed by tofu flour from the Baluran variety at Rp. 51,250/kg and from the Imported variety at Rp. 39,900/kg. Because the output price factor and the price of raw materials greatly determine the added value ratio, the added value ratio obtained by tofu flour from the Wilis variety is 81.27%, Baluran variety 80.39%, and Imported variety 79.16%. From these results, although the added value of imported variety is the lowest, many flour managers use imported variety due to the low input price.

The highest labor income is from tofu flour from the Wilis variety of Rp. 3350, - / kg, tofu flour from the Baluran variety of Rp. 3150 / kg and tofu flour from the Imported variety of Rp. 2500, -, this shows the opposite labor ratio, meaning that the highest labor ratio is obtained from tofu flour from imported soybean varieties at 6.27%, the Wilis variety at 6.175%, and the Baluran variety at 6.146%. The highest profit is from tofu flour from soybeans from the Wilis variety of Rp. 50,900, - (93.82%), from the Baluran variety of Rp. 48,100, - (93.8%), while the lowest profit comes from the Imported variety of Rp. 37,400, - (93.73%).

The highest margin is in tofu flour from the Wilis variety at Rp.56,750,-, from the Baluran variety at Rp.53,750,- and the Imported variety at Rp.42,400,-. While the highest direct labor income is obtained in processing tofu flour from the Wilis variety at 5.9%, the Baluran and Imported varieties are the same at 5.8%. Meanwhile, the contribution of other inputs shows the opposite result; the highest percentage is obtained from the Imported Variety at 5.8%, followed by the Baluran variety at 4.6% and the Wilis variety at 4.4%. Hayami's opinion (1989) is that what determines added value is the market factor that influences the output price, labor wages, raw material prices, and other inputs other than fuel and labor.

CONCLUSION

The following results can be obtained from the research: 1. The income obtained in processing tofu into tofu flour is tofu from the Wilis variety of Rp. 995,000, then tofu from the Baluran variety of soybeans of Rp. 890,000, while tofu from imported soybeans of Rp. 1,040,000. The added value obtained from processed tofu flour from Wilis variety soybeans is Rp. 54,250,- / kg, then tofu flour from Baluran variety of Rp. 51,250,- / kg and from imported varieties of Rp. 39,900,- / kg. Because the output price factor and the price of raw materials greatly determine the added value ratio, the added value ratio obtained from tofu flour from the Wilis variety is 81.27%, the Baluran variety 80.39%, and the Import variety 79.16%.

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