Differences In Raw Material Types On The Production Costs of Skin Crackers In Tengah Tani District

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ABSTRACT

Business actors often choose raw materials based on availability and price, without considering the total cost and overall product quality. This study aims to: (1) determine how the skin cracker production process for fresh, gareman and dried raw materials; (2) determine the contribution of raw material types to production process costs; and (3) determine the differences in raw material types on production costs. The hypothesis of this study is that there are suspected significant differences in the production costs of the skin cracker business based on the type of raw material used. The study was conducted in Tengah Tani District with purposive considerations with a research period from February to August 2025. The population of this study amounted to 16 business units, including 10 units using gareman raw materials, 3 units using fresh raw materials, and 3 units using dried raw materials. The research technique used a census technique so that the entire population was used as a sample and the data analysis technique used one-way ANOVA. The results of the study indicate that based on the selection of raw materials, more consideration is related to technical aspects. The largest contribution to raw material costs is garment raw materials. The total production costs based on differences in raw materials show differences with further analysis showing that production costsdrymuch lower than salted and fresh, but for salted and fresh, there was no statistically significant difference.

Keywords: Cirebon, Gareman, Dry, Skin Crackers, Fresh

1. INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a strategic role in supporting national economic resilience. In Indonesia, MSMEs dominate the economic structure, contributing significantly to Gross Domestic Product (GDP) and labor absorption. Data from the Ministry of Cooperatives and SMEs shows that in 2020, MSMEs contributed approximately 61.97% of national GDP, equivalent to IDR 8,573.89 trillion, and absorbed more than 97% of the national workforce (Hidayat et al., 2022). This role makes MSMEs a key pillar in strengthening the foundation of the people's economy and equitable development, including in rural areas (Rachmat & Darmansyah, 2023).

One MSME sub-sector with potential for growth is the food processing industry. As an agricultural and maritime nation, Indonesia possesses a wealth of natural resources, both plant and animal, that can be processed into value-added food products. One popular traditional processed

product is skin crackers, generally made from cow or buffalo hide. This product has economic value and consumer appeal due to its crunchy texture and distinctive flavor, making it a popular addition to meals and snacks (Sobichah et al., 2022). The skin cracker production process involves cleaning the skin, boiling, drying, and frying. In practice, the type of raw material used significantly determines cost efficiency, product quality, and market competitiveness.

The raw materials for skin crackers are generally divided into three categories: fresh skin, dried skin, and dried skin. Each of these raw materials has different characteristics, including water content, shelf life, ease of processing, and market price (Afifah et al., 2024; Jannah et al., 2023). Although fresh skin produces crackers with a crispier texture and is easier to shape, it cannot be stored as a raw material stock. Storing it as a raw material requires more time and energy for the drying process (Zaki et al., 2023). Meanwhile, dried skin has advantages in terms of shelf life, but requires a re-boiling process, which increases operational costs (Lilir et al., 2021). The use of skin materialsgarmanis considered more efficient because it can accelerate the production process and reduce energy consumption (Suprianto & Serip, 2021). This efficiency contributes to achieving a high R/C ratio and significant business profitability (Juliyarsi et al., 2022). Therefore, raw material selection directly impacts production cost structure, labor time, and the need for additional materials.

Tengah Tani District in Cirebon Regency is a center for a fairly active and growing home industry producing skin crackers. This industry utilizes a variety of raw materials, including fresh, salted, and dried skins, sourced from local and international markets. This diversity reflects differences in production strategies among business players, directly impacting their cost structures and business sustainability. Raw material choices are heavily influenced by considerations of cost efficiency, quality, and availability. Fresh skins are preferred because they produce tastier and crispier crackers, are easy to process, and are readily available near slaughterhouses. Salted skins, which retain their pliable texture and require minimal reprocessing resources, are more efficient for small-scale producers. Dried skins, on the other hand, have advantages in terms of shelf life, ease of distribution, and allow producers to maintain large stocks. However, they require significant reprocessing resources.

Initial observations indicate that small-scale businesses with access to slaughterhouses (RPH) more frequently use fresh hides, while those using salted and dried hides generally purchase from outside the region or through middlemen. This difference impacts production costs, even

though the final products are relatively similar. Furthermore, the abundant availability of animal hide raw materials in the region, resulting from the development of agribusiness and animal husbandry, supports the sustainability of the hide cracker industry, which also contributes to job creation and family economic growth. However, initial interviews revealed that most businesses have not calculated detailed production costs based on the type of raw material used. Many focus solely on the purchase price without considering hidden costs such as fuel consumption, labor duration, and the use of additional materials. This lack of understanding makes it difficult for them to formulate efficient production strategies, especially when raw material prices rise amid stagnant consumer purchasing power.

However, empirical studies specifically comparing the impact of each type of raw material on production costs at the MSME scale in this region are still limited. However, according to Ramkutih (2024), production input efficiency has direct implications for optimizing output and business competitiveness. Therefore, decisions regarding raw material types should not be based solely on availability or market price, but also consider process efficiency and product quality. In increasingly competitive markets, MSMEs are required to balance product quality and cost efficiency as part of their business sustainability strategy.

This research aims to: (1) find out how the production process of skin crackers for fresh, salted and dried raw materials; (2) find out the contribution of raw material types to production process costs; and (3) find out the differences in raw material types with production costs.

the research hypothesis is:

H0: It is suspected that there is no significant difference in the production costs of the skin cracker business based on the type of raw materials used.

H1: It is suspected that there is a significant difference in the production costs of the skin cracker business based on the type of raw materials used.

2. RESEARCH METHODS

This research was conducted in Tengah Tani District, Cirebon Regency, a region well-known as a center for the home industry of skin crackers. This area was purposively selected as the research location due to the diversity of raw materials used, namely salted skin, fresh skin, and dried skin. This condition makes Tengah Tani District a relevant location to examine differences in production costs based on raw material type. The research was conducted from February to August

2025, encompassing planning activities, field data collection, data processing, statistical analysis, and the preparation of research results in the form of a scientific article.

The approach used in this study is quantitative with a comparative approach. The objective of this study was to determine whether there are significant differences in the production costs of skin crackers based on the type of raw material used. The types of raw materials focused on in this study consist of three groups: fresh skin, salted skin, and dried skin.

The population in this study was all small and medium enterprises (SMEs) processing skin crackers in the Tengah Tani District, using one of the three types of raw materials. Based on the results of the initial survey conducted by the researchers, there were 10 businesses using salted skin, 3 businesses using fresh skin, and 3 businesses using dried skin. Given the relatively small population size and still comprehensive coverage, this study used a census technique, where the entire population was used as a sample (Simarmata et al., 2021). This technique was chosen to obtain a representative picture and avoid bias that might arise from the sampling technique.

The variables in this study consist of independent variables and dependent variables. The independent variables include the types of raw materials used in the production process, namely salted leather (X_1), fresh leather (X_2), and dried leather (X_3). Meanwhile, the dependent variable in this study is the total production cost (Y), which is measured in rupiah per unit of production volume. Production costs include all components of expenses incurred by business actors, including raw materials, labor, energy, auxiliary materials, and other operational costs.

The data used in this study is primary data obtained directly from respondents through structured interviews and field observations. The instrument used is a production cost structure sheet for each type of raw material, which records in detail the components and total costs incurred during the production process.

The data analysis technique used was one-way analysis of variance (ANOVA), which was used to test the average differences between three independent groups on one dependent variable, namely production costs (Unaradjan, 2019). If the ANOVA test results show a significant difference, the analysis will be continued with a further test (post hoc) such as Tukey HSD to determine which group shows a significant difference in production costs (Sugiyono, 2019). Data analysis was carried out using SPSS statistical software version 26.0, which allows for accurate analysis and in accordance with inferential statistical rules.

3. RESULTS AND DISCUSSION

Production process

The main raw material used in the production of skin crackers in Tengah Tani District is buffalo hide. However, the production process is not uniform, but varies depending on the type of raw material used. In general, there are three types of raw hide used by business actors: fresh hide, gareman hide, and dried hide (dried hide). Each type of raw material has different physical characteristics and moisture content, which directly affect the stages and treatments in the production process. These differences not only impact the duration and intensity of processing, such as boiling, drying, or cutting, but also impact resource use, labor costs, time efficiency, and the final results of skin crackers (Suryantara & Animah, 2021). The production process includes:

1)   Gareman

Salted hides are animal skins that have undergone a partial drying process, usually through a short sun-drying process. In the initial stages of production, salted hides still require cleaning, but they don't require a long boiling process because the hide's structure is already semi-dry. This process is then followed by a short soaking to soften the hide before being dried again until completely dry. Once dry, the hides are fried and packaged.

Compared to fresh hides, the production process using salted hides is more time- and cost-efficient. Producers don't need to expend significant energy on initial boiling and drying, as some of these processes have already been performed. Therefore, although the raw material price tends to be higher than for fresh hides, the shorter production time and fewer laborers result in relatively lower and more stable total production costs (Cahyani et al., 2021).

2)   Fresh skin

Fresh hides are obtained directly from slaughterhouses, wet and uncured. The production process begins with initial cleaning, which involves washing and removing any remaining fur and fat. The hides are then boiled until softened and cut to the desired size. They are then dried in the sun for several days until completely dry. Once dry, they are fried in hot oil until they expand into skin crackers. The product is then packaged and ready for sale.

Because fresh skin contains a high water content, the drying process requires a long time and favorable weather. This increases costs in the form of labor, fuel used for boiling, and the risk

of spoilage if not processed promptly. However, the final crackers made from fresh skin are usually of better quality, both in terms of crispiness and flavor (Cahyani et al., 2021).

3)   Dry skin

Dried skin is a raw material that is completely dried and can be stored for a long time. The production process begins by soaking the skin in water for several hours or even overnight to restore its elasticity. Afterward, the skin is cleaned of any remaining dirt and boiled until tender. The skin is then cut and dried again until it reaches a suitable level of dryness for frying. Afterward, it is fried and packaged.

While this material is easy to store and suitable for large-scale production, the initial soaking and boiling process requires significant energy, water, and time. This increases costs in the form of fuel consumption and labor. However, the advantages of this material are a stable supply and a minimal risk of spoilage (Cahyani et al., 2021).

Contribution of raw material types to production costs

Raw material costs are a key component in the cost structure of skin cracker production. Differences in raw material types, such as moisture content, price, and pre-production treatment, directly affect total production costs (Jannah et al., 2023). The different characteristics of each raw material cause variations in their contribution to the overall process costs. Furthermore, each type of raw material requires specific handling and production stages, thus impacting the costs incurred by producers during the process (Sobichah et al., 2022). Production data for one month is presented in Table 1 below:

Table 1. Production Data of Skin Cracker Producers

No	Name of MSME	Leather Raw Materials	Raw Materials (Kg)	Leather Raw Material Cost (Rp)	Total Production Cost (Rp)	Contribution (%)
1	Mahfud	Gareman	210	5.250.000	7.531.917	69,70
2	Sri	Gareman	685	17.125.000	20.873.452	82,04
3	But Ha	Gareman	210	5.880.000	8.584.083	68,50
4	Denis	Gareman	230	5.750.000	10.416.208	55,20
5	The street	Gareman	280	7.000.000	12.433.606	56,30
6	H.Baing	Gareman	490	12.250.000	16.581.542	73,88
7	Munari	Gareman	350	8.750.000	21.451.406	40,79
8	Anwar	Gareman	280	7.280.000	9.568.806	76,08
9	Said	Gareman	351	9.126.000	11.925.056	76,53
10	Amadin	Gareman	275	7.150.000	9.341.500	76,54
11	Najib	Fresh	120	3.600.000	5.891.028	61,11

12	H. Dada	Fresh	250	3.764.589	7.413.528	50,78
13	H. Lily	Fresh	140	3.710.000	5.612.117	66,11
14	Harjo	Dry	375	18.750.000	48.920.178	38,33
15	Mass Out	Dry	310	21.700.000	24.888.667	87,19
16	Great	Dry	315	20.475.000	36.548.125	56,02
Rata-Rata			304	9.847.537	16.123.826	64,69

Source: Research Data

Table 1 shows that the average raw material used by producers is the salted leather type. Salted leather is chosen based on its advantages, which offer a balance between shelf life and ease of processing. With a lower water content than fresh leather, salted leather can be stored longer while remaining flexible enough to be processed without the need for complicated rehydration. Furthermore, salted leather does not require additional drying like fresh leather or re-boiling like dried leather, making it much more practical and saving time and labor in the production process (Wahyudi, 2021).

From an economic perspective, the price of salted leather also tends to be cheaper than fresh leather, thus helping to reduce raw material costs. However, despite being cheaper and more practical, the contribution of salt raw material costs to total production costs is actually higher than other leathers. Based on data, the average raw material cost reaches Rp. 9,847,537 out of a total average production cost of Rp. 16,123,826, so the contribution of raw materials to total costs reaches 64.69%. In more detail, the contribution of raw material costsgarmanThe contribution of the total cost is 67.57%, which is greater than that of dried raw materials (60.51%) and fresh skin (59.33%). This condition indicates that the high contribution of raw material costsgarmanThis is likely due to the larger volume of use required for production, so that even though the unit price is lower and the process is more practical, the total cost becomes more dominant in the production cost structure.

Differences in Types of Raw Materials on Production Costs

The data analyzed consisted of two main variables: raw material category data as the independent variable and total production costs as the dependent variable. This approach allows for evaluation of how variations in raw material types affect the quality of raw materials.influencethe total production costs. Data on the types of raw materials and total production costs can be seen in Table 1. Production Data for Skin Cracker Producers.

The analysis stage begins with collecting data on raw material categories, including leather.garman (X_1), fresh skin (X_2), and dry skin (X_3), and total production costs (Y). Next,

normality and homogeneity of variance tests are performed to ensure the data meets the ANOVA assumptions. If met, a One-Way ANOVA test is performed to test the difference in average production costs between raw material types. If the ANOVA results are significant, the next step is the Tukey HSD Post Hoc test to determine which raw material groups are significantly different.

1) Normality Test

A normality test was performed to ensure that the total production cost data for each raw material category followed a normal distribution. This is important because many parametric statistical methods, including ANOVA, assume normal data for reliable analysis results.testThis will determine whether the data meets these assumptions or whether another approach is needed (Sugiyono, 2019). The analysis used in this data normality test used the Shapiro-Wilk method because the sample size was less than 50 (Unaradjan, 2019). The results of the data normality test are shown in Table 2 below

Table 2. Data Normality Test

Tests of Normality				
		Shapiro-Wilk		
	Category	Statistic	df	Say.
Total Production Cost	Gareman	,856	10	,068
	Fresh	,863	3	,276
	Dry	1,000	3	,967
a. Lilliefors Significance Correction				

Sumber: Output SPSS, 2025

Based on the results of the normality test in Table 2. using Shapiro-Wilk, it was obtained that the significance value for the Gareman category was 0.068 (n = 10), for the Fresh category it was 0.276 (n = 3), and for the Salt category it was 0.068 (n = 10).Dryof 0.967 (n = 3). The significance value in the three categories is greater than the 0.05 significance level, so it can be concluded that the total production cost data in the three categories is normally distributed.

2) Homogeneity Test

After testing for normality, the homogeneity of variance test aims to examine the similarity of data variation across raw material groups. The assumption of homogeneity of variance is necessary for the ANOVA test to produce valid results in comparing the average production

costs of various raw material types. The results of the data homogeneity test are shown in Table 3 below:

Table 3. Data Homogeneity Test

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Say.
Total Production Cost	Based on Mean	3,380	2	13	,066
	Based on Median	2,551	2	13	,116
	Based on Median and with adjusted df	2,551	2	7,378	,144
	Based on trimmed mean	3,258	2	13	,071

Sumber: Output SPSS, 2025

Based on the results of the homogeneity of variance test using Levene's Test in Table 3, the significance value obtained based on the average is 0.066 with degrees of freedom of 2 and 13. In addition, the significance values based on the median, median with adjusted degrees of freedom, and trimmed mean are 0.116, 0.144, and 0.071, respectively. All of these significance values are greater than 0.05, so it can be concluded that the assumption of homogeneity of variance is met, and further statistical analysis can use parametric tests that require homogeneous variances between groups.

3)   Uji One Way ANOVA

The One-Way ANOVA test was used to test the hypothesis of whether there was a statistically significant difference in the average total production costs between three groups of raw materials: fresh, salted, and dried leather. This test helps determine whether the type of raw material affects the overall production costs (Unaradjan, 2019). The results of the One-Way ANOVA test are shown in Table 4 below:

Table 4. One Way ANOVA Test

ANOVA					
Total Production Cost					
	Sum of Squares	df	Mean Square	F	Say.
Between Groups	1675753458840814,500	2	837876729420407,200	20,967	,000
Within Groups	519509859391221,750	13	39962296876247,830		
Total	2195263318232036,200	15			

Sumber: Output SPSS, 2025

Table 4 shows the results of the One-Way ANOVA test on the total production costs of skin crackers based on the type of raw material, obtaining an F value of 20.967 with a significance value (p-value) of 0.000 ($p < 0.05$). This significance value is smaller than 0.05 indicates that there is a statistically significant difference between the average production costs of the raw material groups tested. Thus, the alternative hypothesis stating that there is a difference in the average production costs between types of raw materials is accepted. These results indicate that the type of raw material significantly influences the production costs of skin crackers in Tengah Tani District. To identify which raw material groups are specifically different, further post hoc testing is required.

4)   Uji Post Hoc (Tukey HSD)

If the ANOVA results show significant differences, a post hoc Tukey HSD test will be used to identify which pairs of raw material groups have significantly different production costs. This test provides a detailed overview of the sources of variation between groups (Unaradjan, 2019). The post hoc test is shown in Table 5 below:

Table 5. Post Hoc Follow-up Test

Multiple Comparisons						
Dependent Variable: Total Production Cost						
Tukey HSD						
					95% Confidence Interval	
(I) Category	(J) Category	Mean Difference (I-J)	Std. Error	Say.	Lower Bound	Upper Bound
Gareman	Fresh	6565199,933	4161369,404	,290	-4422634,35	17553034,22
	Dry	23914899,067[*]	4161369,404	,000	-34902733,35	-12927064,78
Fresh	Gareman	-6565199,933	4161369,404	,290	-17553034,22	4422634,35

	Dry	-30480099,000[*]	5161543,495	,000	-44108830,09	-16851367,91
Dry	Gareman	23914899,067[*]	4161369,404	,000	12927064,78	34902733,35
	Fresh	30480099,000[*]	5161543,495	,000	16851367,91	44108830,09
	*. The mean difference is significant at the 0.05 level.					

Sumber: Output SPSS, 2025

Based on the results of the post hoc test using the Tukey HSD method on the variable of total production costs of skin crackers according to raw material type, significant differences were found in several pairs of groups. Significant average differences were shown by the pairsGareman And Drywith a mean difference value of -23,914,899.07 (p = 0.000), and the Fresh and Dry pair with a mean difference of -30,480,099.00 (p = 0.000). This means that production costs in the categoryDrysignificantly lower compared to the Gareman and Segar categories. In contrast, the average difference in production costs between Gareman and Segar of 6,565,199.93 was not significant (p = 0.290), so the two groups had statistically similar production costs. The 95% confidence interval for the difference in means in significant pairs did not cross zero, supporting the conclusion that there was a real difference. These results confirm that the type of Keringan raw material has a significantly different effect on the amount of production costs when compared to other raw materials.Garemanand Fresh, while the difference betweenGaremanand Fresh is not strong enough to be categorized as significant.

Discussion

The findings show that there are significant differences in production costs based on the type of raw material,whereDried ingredients have been shown to provide higher cost efficiency than dried or fresh ingredients. This finding reflects real-world conditions, where business owners consider efficiency, product quality, and raw material availability when selecting the type of skin used in cracker production.

Fresh skin is a prime raw material for businesses with direct access to slaughterhouses (RPH) due to its ease of processing and ability to produce products with a savory, crunchy texture that meets consumer preferences.garman, which has a flexible texture and does not require complicated reprocessing, is more popular with small-scale entrepreneurs who focus on simplicity and efficiency of production processes. Unlike these two materials, dried leather offers advantages in terms of storage durability and ease of distribution, making it suitable for businesses that require

large stocks and more flexible inventory management (Dzulaihaet al., 2020). This condition confirms that each type of raw material has unique characteristics that directly influence the production cost structure (Suprianto, 2020).

Although the final products from the three types of raw materials are relatively similar in terms of organoleptic properties, differences in processing and logistics lead to significant cost variations. This is consistent with the study by Afifah et al. (2024), which emphasized the importance of raw material management in determining cost efficiency in the agro-industrial skin cracker product. Furthermore, research by Hidayat et al. (2021) highlighted the lack of comprehensive cost calculations by micro and small businesses, particularly hidden costs such as fuel consumption and work duration, which impact the low effectiveness of cost-efficiency strategies. This situation indicates the need to improve the managerial capacity of business actors to manage production costs in a more detailed and strategic manner.

The abundant availability of animal skin raw materials in the research area, resulting from the development of local agribusiness and livestock, is a strategic factor in the selection of raw materials for the skin cracker business. The right choice of raw materials significantly determines production efficiency and final product quality, thus playing a crucial role in business sustainability and competitiveness. However, field experience indicates that many business owners lack a thorough understanding of the characteristics and cost implications of each type of raw material used. Therefore, improving understanding of raw material selection and its impact on production costs is crucial to support more effective and sustainable business management (Safitri & Husni, 2023; Zaki et al., 2023).

The use of dried materials as the primary raw material in this context is also in line with developments in modern production technology. Proper drying not only extends the shelf life of products but also facilitates inventory management, allowing businesses to avoid losses due to stock outs.expired(Kisworo et al., 2023). This advantage is relevant in relation to increasingly digitalized distribution and marketing, where the ability to manage stock and supply is a critical factor for the success of MSMEs in a competitive market (Azizah et al., 2023). In addition to the technical aspects of production and stock management, this study contributes to the scientific discourse on the economics of traditional agro-industrial production in Indonesia. The use of systematically analyzed empirical data provides a comprehensive understanding of the production

cost structure and the determinants that must be managed to ensure efficient and sustainable skin cracker production (Novia et al., 2018).

4. CONCLUSION

Based on the research results, it can be concluded that the process of producing skin crackers using fresh raw materials,garman, And dryhave differences thatinfluenceProduction cost structure. The type of raw material contributes significantly to the total cost of the production process, with fresh ingredients contributing less to total production costs than dried and salted ingredients. Furthermore, there are significant differences in production costs between these raw material types. These findings emphasize that raw material selection is a crucial factor in managing production costs to improve the efficiency and competitiveness of the skin cracker business in Tengah Tani District.

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