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Value Addition, Financial Feasibility, Quality, and Development Strategies of Bengkuang (Jicama) Chips in Padang City, Indonesia

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A B S T R A C T

This study evaluates the value added, financial feasibility, product quality, and development strategy of bengkuang chips produced by Jelly Snack'O in Padang City using the Hayami Method, investment indicators, SNI 01-4305-1996, and SWOT analysis. Processing bengkuang and wheat flour generated high value-added ratios of 91.29% and 75.12%, respectively, while the business met all investment feasibility criteria with a payback period of approximately 17 months. The product complied with SNI chemical and organoleptic standards. However, monthly net income was only IDR 113,844, and profitability was more sensitive to selling price than raw-material costs, indicating that feasibility does not necessarily ensure sufficient income or scalability. SWOT analysis identified key priorities: PIRT and Halal certification, improved packaging, flavor diversification, and expanded digital marketing. The findings demonstrate that integrating value-added, financial, quality, and strategic analyses provides a comprehensive framework for distinguishing business feasibility from scalability and guiding MSME development

Contribution to the Sustainable Development Goals (SDGs):
SDG 2: Zero Hunger
SDG 8: Decent Work and Economic Growth
SDG 9: Industry, Innovation, and Infrastructure
SDG 12: Responsible Consumption and Production

1. INTRODUCTION

1.1 Background

Bengkuang (*Pachyrhizus erosus* L.) is a leading horticultural commodity that has long served as an identity and mascot of Padang City, with production centers concentrated in the districts of Kuranji, Pauh, Koto Tangah, and Nanggalo [1]. However, most bengkuang is still sold fresh with very limited value added [2], while its popularity as a signature Padang souvenir has increasingly been displaced by other snack products. Processing bengkuang into chips offers a strategic solution because of its longer shelf life and strong potential as a competitive souvenir product, as findings show that bengkuang chips have quality characteristics and consumer acceptance comparable to potato chips [3].

One micro, small, and medium enterprise (MSME) actively producing bengkuang chips in Padang City is Jelly Snack'O; however, this business still faces four fundamental issues that have not yet been scientifically addressed. First, the actual value added from processing bengkuang into chips remains unknown, even though this data is crucial for entrepreneurs, investors, and the government to assess the economic benefits of product transformation [4]. Second, no comprehensive financial feasibility study using standard indicators such as NPV, IRR, and B/C Ratio has been conducted. Third, no product quality evaluation based on an established standard has been carried out, given that no specific SNI for bengkuang chips is yet available; SNI 01-4305-1996 (cassava chips) is the most relevant reference [5]. Fourth, a systematic business development strategy based on internal and external factor analysis (SWOT) has not yet been formulated [6].

The scientific novelty of this study does not lie merely in combining four analytical methods, but in constructing an integrated decision-making chain that traces raw material utilization through value creation, financial feasibility, product quality compliance, and strategic business development within

a single case. Comparable agroindustry studies on jackfruit chips [8], cassava [9], tomato dodol [10], and strawberries [11] each report value-added findings in isolation, without linking these results to the business's financial viability, its compliance with a quality standard, or an actionable development strategy grounded in those findings. These four aspects are thus generally studied separately for other processed food products and are rarely integrated into a single comprehensive study, even though they are interrelated and equally necessary for decision-making by both business operators and local government. This study was designed to fill this gap by tracing that decision-making chain for Jelly Snack'O's bengkuang chips in Padang City: first confirming that processing generates real economic value, then verifying that the business is financially sound, then confirming that the resulting product meets an established quality standard, and finally formulating development strategies grounded in all three preceding findings. The results of this study are expected to serve as a scientific reference for MSME operators in optimizing their businesses, as well as evidence-based recommendations for the Padang City Government in promoting the sustainable development of the bengkuang agroindustry.

1.2 Research Objectives

This study aims to: (1) analyze the value added of processing bengkuang into chips using the Hayami Method; (2) analyze the financial feasibility of the business based on the NPV, IRR, and B/C Ratio indicators; (3) evaluate the quality of bengkuang chip products based on SNI 01-4305-1996; and (4) formulate a business development strategy based on a SWOT analysis.

2. RESEARCH METHODS

This study was conducted at one of the MSMEs processing bengkuang into chips in Padang City, West Sumatra Province, namely Jelly Snack'O, which was selected *purposively* because it has been in continuous production for more than two years (>2 years) and was willing to provide the required data. The study was conducted over five months (January–May 2026), covering primary and secondary data collection, product sampling, laboratory quality testing, and data processing and analysis. Primary data were obtained through direct observation of the production process, in-depth interviews with the business owner and the Head of the Padang City Office of Cooperatives and MSMEs, and documentation of purchasing, production, and sales records. Secondary data were obtained from the Central Statistics Agency (BPS) and related literature.

Value-added analysis was conducted using the Hayami Method [4], which calculates value added, the value-added ratio, labor returns, and processing profit, carried out separately for the two main raw materials—bengkuang and wheat flour—given their differing proportions in the production process. Financial feasibility was analyzed using Net Present Value (NPV), Internal Rate of Return (IRR), and Benefit Cost (B/C) Ratio indicators [7], with cash flow projections over five years (2026–2030) and a *discount rate* of 6%, following the interest rate of the People's Business Credit (Kredit Usaha Rakyat, KUR); the payback period was calculated to determine the investment recovery period. The quality of bengkuang chips was evaluated based on the parameters of SNI 01-4305-1996 (moisture content, ash content, free fatty acid/FFA, and organoleptic properties) [5]. Because no Indonesian National Standard has yet been issued specifically for bengkuang chips, SNI 01-4305-1996 for cassava chips was adopted as a reference benchmark rather than as a product-specific regulatory standard. This choice is justified by three considerations: both commodities belong to the same product category of tuber-based chips processed through slicing or shaping followed by deep-frying, so their relevant chemical quality parameters (moisture, ash, and free fatty acid content) are technically comparable [13]; no closer alternative standard exists; and prior research specifically on bengkuang chips has adopted the same reference [3]. Differences between bengkuang and cassava in raw moisture content, starch structure, and oil-absorption behavior are acknowledged, so meeting SNI 01-4305-1996 is interpreted here as evidence that the product falls within an accepted quality range for fried tuber-based chips, rather than as certification against a bengkuang-specific requirement. Quality was assessed through laboratory testing of three samples from different production batches at the Laboratory of Chemistry, Biochemistry, Agricultural Products, and Food Nutrition, Faculty of Agricultural Technology, Universitas Andalas. The business development strategy was formulated through a SWOT analysis [6], which identified strengths, weaknesses, opportunities, and threats based on observations, interviews, and the findings of the three preceding analyses.

3. RESULTS AND DISCUSSION

3.1 Business Overview

Jelly Snack'O is the only bengkuang chip processing MSME fostered by the Padang City Office of Cooperatives and MSMEs, located in Nanggalo District, operating at a micro-business scale with an annual turnover of approximately IDR 65,000,000. The business already holds a Business Identification Number (NIB) but has not yet obtained PIRT certification (Pangan Industri Rumah Tangga, i.e., Indonesia's Home Industry Food Production permit, a food-safety license issued by the local health office for household-scale food producers), Halal certification (official confirmation that the product complies with Islamic dietary law, issued by Indonesia's Halal Product Assurance Organizing Agency, BPJPH), or an official quality standard, making this an internal weakness that needs to be addressed promptly. The production process begins with peeling and pulverizing the bengkuang, mixing it with wheat flour as a binding agent along with complementary ingredients (tapioca flour, sugar, salt, and baking powder), forming the dough, frying, draining, and finally packaging. This dough-based approach was developed to address bengkuang's high moisture content (approximately 80–90%), producing chips that are crispier and more uniform than those made with the conventional slicing technique. In a single production run (carried out four times per month), the business uses 1.417 kg of fresh bengkuang and 2.833 kg of wheat flour, yielding 4.112 kg of bengkuang chips sold at IDR 70,000/kg.

3.2 Value-Added Analysis (Hayami Method)

Value-added analysis was conducted separately for bengkuang and wheat flour, with an Other Input Contribution (Sumbangan Input Lain, SIL) of IDR 58,438 per production process, allocated proportionally based on raw material value

(bengkuang 25.93%; wheat flour 74.07%). Table 1 presents the calculation results.

Table 1. Comparison of Value Added for Bengkuang and Wheat Flour in Bengkuang Chip Processing (Hayami Method).

Parameter	Bengkuang	Wheat Flour
Conversion Factor	2.90	1.45
Product Value (IDR/kg Raw Material)	IDR 203,191.06	IDR 101,595.53
Value Added (IDR/kg Raw Material)	IDR 185,496.44	IDR 76,317.50
Value-Added Ratio (%)	91.29	75.12
Labor Return (IDR/kg Raw Material)	IDR 105,882.35	IDR 52,941.18
Labor Share (%)	57.08	69.37
Processing Profit (IDR/kg Raw Material)	IDR 79,614.09	IDR 23,376.32
Value-Added Category	High (>40%)	High (>40%)

Both conversion factors follow directly from the production data reported in Section 3.1: with an average of 4.112 kg of chips produced from 1.417 kg of fresh bengkuang and 2.833 kg of wheat flour per production run, the conversion factor is calculated as output divided by raw-material input ($d = a \div b$), giving $4.112 \div 1.417 = 2.90$ for bengkuang and $4.112 \div 2.833 = 1.45$ for wheat flour. The value added for each raw material was then obtained as product value minus raw-material price minus the allocated Other Input Contribution ($k = j - h - i$, where the product value $j = d \times f$ is the conversion factor multiplied by the selling price), yielding IDR 185,496.44/kg (ratio 91.29%, high category) for bengkuang and IDR 76,317.50/kg (ratio 75.12%, high category) for wheat flour, as summarized with the full intermediate values in **Table 1**. A higher conversion factor does not by itself make bengkuang intrinsically superior to wheat flour, since the conversion factor reflects the input–output structure of this specific production recipe (1 part bengkuang to 2 parts wheat flour) rather than an inherent property of the commodity. What can be concluded is that, under the production structure studied, the bengkuang input generated a higher calculated value-added contribution than the wheat-flour input, consistent with the value-added principle of the Hayami Method [4]. The proportion of labor return for wheat flour (69.37%) was greater than that for bengkuang (57.08%), whereas the processing profit for bengkuang (IDR 79,614.09/kg) far exceeded that for wheat flour (IDR 23,376.32/kg), indicating that bengkuang processing captured a larger share of value as processing profit rather than as labor compensation. The high-category value-added ratio found in this study is consistent with findings on similar horticultural commodities, such as jackfruit chips [8], cassava agroindustry [9], tomato dodol [10], and strawberries [11], which likewise show that processing into derivative products can significantly increase the economic value of agricultural raw materials.

3.3 Financial Feasibility Analysis

Total equipment investment for Jelly Snack'O amounted to IDR 2,795,000, with an annual depreciation of IDR 609,833 (straight-line method). Total monthly operational costs amounted to IDR 1,037,572 (variable costs of IDR 980,753 and fixed costs of IDR 56,819), while monthly revenue amounted to IDR 1,151,416, resulting in a net income of IDR 113,844/month. Cash flow projections over five years (2026–2030), using a 6% discount rate, produced the financial feasibility indicators presented in **Table 2**.

Table 2. Summary of Financial Feasibility Indicators for Jelly Snack'O.

No	Indicator	Value	Criterion	Status
1	Net Present Value (NPV)	IDR 5,528,400	NPV > 0	Feasible
2	Internal Rate of Return (IRR)	64.90%	IRR > 6% (KUR)	Feasible
3	Benefit-Cost Ratio (B/C)	1.10	B/C > 1	Feasible
4	Payback Period (PP)	±17 months	PP < 5 years	Feasible

An NPV of IDR 5,528,400 (>0) indicates that the business is feasible to operate. An IRR of 64.90% far exceeds the KUR interest rate (6%), reflecting an MSME with a small initial investment that can consistently generate positive cash flow. A B/C Ratio of 1.10 (>1) means that every IDR 1 of cost incurred generates IDR 1.10 of benefit, with a payback period of approximately 17 months. These four indicators show that the Jelly Snack'O bengkuang chip business is feasible to operate and develop in the long term, consistent with the investment feasibility criteria commonly used in business feasibility studies [7,12]. (**Table 3**)

Table 3. Annual Cash Flow Projection and Discounted Cash Flow, Jelly Snack'O (2026–2030).

Year	Revenue (IDR)	Cash Operating Cost (IDR)	Net Cash Flow (IDR)	Discount Factor (6%)	PV of Net Cash Flow (IDR)
1	13,816,992	11,841,047	1,975,945	0.9434	1,864,099
2	13,816,992	11,841,047	1,975,945	0.8900	1,758,584
3	13,816,992	11,841,047	1,975,945	0.8396	1,659,042
4	13,816,992	11,841,047	1,975,945	0.7921	1,565,134
5	13,816,992	11,841,047	1,975,945	0.7473	1,476,541
Total PV of Net Cash Flow					8,323,400

Initial investment (equipment) was IDR 2,795,000, depreciated on a straight-line basis over 5 years and excluded from the cash-cost figures above since depreciation is a non-cash charge; no terminal or salvage value was assumed at the end of the projection horizon, as the equipment continues to be used beyond year 5. Annual revenue and cash operating costs were held constant across the five-year horizon, reflecting the assumption of an unchanged monthly production frequency (4 runs/month), output per run (4.112 kg), and selling price (IDR 70,000/kg); no explicit inflation adjustment was applied to raw-material prices over the projection period. Net Present Value was then obtained as the total present value of net cash flow minus the initial investment: NPV = IDR 8,323,400 − IDR 2,795,000 = IDR 5,528,400. (**Table 4**)

Table 4. Sensitivity Analysis of Financial Feasibility Indicators to Changes in Raw-Material Cost and Selling Price.

Scenario	NPV (IDR)	IRR (%)	B/C Ratio	Payback Period (months)	Status
Base case	5,528,400	64.90	1.10	16.97	Feasible
Raw-material cost (bengkuang, wheat flour, cooking oil) −20%	8,904,396	95.93	1.18	12.08	Feasible
Raw-material cost −10%	7,216,400	80.61	1.14	14.11	Feasible
Raw-material cost +10%	3,840,408	48.57	1.07	21.29	Feasible
Raw-material cost +20%	2,152,412	31.22	1.04	28.56	Feasible
Selling price −20%	(6,112,035)	n/a*	0.88	not recovered	Not feasible
Selling price −10%	(291,816)	2.07	0.99	56.44	Not feasible
Selling price +10%	11,348,624	117.67	1.22	9.99	Feasible
Selling price +20%	17,168,843	168.35	1.33	7.08	Feasible

*IRR could not be computed because the projected cash flow does not turn positive within the projection horizon under this scenario.

The sensitivity analysis shows that Jelly Snack'O's financial feasibility is far more sensitive to selling price than to raw-material cost fluctuations. Even a simultaneous 20% increase in the price of bengkuang, wheat flour, and cooking oil still leaves the business feasible on all four indicators, whereas a 10% decrease in the selling price alone is sufficient to turn NPV negative and the B/C Ratio below 1. This asymmetry indicates that the business's viability rests primarily on maintaining its current selling price and sales volume, and that pricing strategy and market positioning deserve at least as much managerial attention as cost efficiency.

Although all four investment indicators classify the business as feasible, the resulting profit magnitude deserves closer scrutiny. Monthly revenue of IDR 1,151,416 translates into a monthly net income of only IDR 113,844, a modest surplus for a household-scale enterprise. This finding illustrates an important distinction between financial feasibility and economic attractiveness or scalability: feasibility, as captured by NPV, IRR, B/C Ratio, and payback period, indicates that the business generates a positive return on the capital invested, but it does not by itself indicate whether that return is large enough to expand the business or to meaningfully support the operator's household livelihood. In this case, the business is technically feasible yet, at its current scale of four production runs per month, generates limited capacity for reinvestment or income growth. This distinction is consistent with the sensitivity findings above: because profitability is highly responsive to selling price, scaling up production volume without also strengthening branding, certification, and market access (as discussed in Section 3.5) risks eroding, rather than improving, the business's income position if increased supply cannot be absorbed at the current price point.

3.4 Product Quality Evaluation

Quality testing was conducted on three samples of bengkuang chips from different production batches at the Laboratory of Chemistry, Biochemistry, Agricultural Products, and Food Nutrition, Faculty of Agricultural Technology, Universitas Andalas. Table 5 presents the evaluation results.

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Table 5. Quality Evaluation of Jelly Snack'O Bengkuang Chips Based on SNI 01-4305-1996, with Values for Each of the Three Production-Batch Samples.

No	Test Parameter	Sample 1	Sample 2	Sample 3	Mean ± SD	SNI 01-4305-1996	Remarks
1	Moisture Content (%)	1.76	1.69	1.72	1.72 ± 0.03	Max. 6.0	Compliant
2	Ash Content (%)	1.50	1.49	1.52	1.51 ± 0.02	Max. 2.5	Compliant
3	Free Fatty Acid/FFA (%)	0.28	0.31	0.36	0.32 ± 0.04	Max. 0.7	Compliant
4	Odor	Normal	Normal	Normal	Normal/characteristic	Normal/characteristic	Compliant
5	Taste	Normal	Normal	Normal	Normal/characteristic	Normal/characteristic	Compliant
6	Color	Normal	Normal	Normal	Normal/characteristic	Normal/characteristic	Compliant
7	Texture	Crispy	Crispy	Crispy	Crispy	Normal/crispy	Compliant

3.5 SWOT Analysis and Development Strategy

Internal and external factors of the bengkuang chip business in Padang City were identified qualitatively from semi-structured interviews with two informants: the business owner, as the primary source on internal factors (strengths and weaknesses), and an official from the Padang City Office of Cooperatives and MSMEs, who validated the identified factors and provided contextual information on external conditions (opportunities and threats). No weighting or rating procedure (e.g., IFE/EFE scoring) was applied; the resulting SWOT matrix, summarized in **Table 6**, therefore reflects a qualitative synthesis of these two informants' input rather than a quantitatively scored prioritization.

Table 6. SWOT Matrix of the Bengkuang Chip Industry in Padang City.

Factor	Description
Strengths (S)	A signature commodity and mascot of Padang City; raw material available year-round; high value added (91.29%/75.12%); financially feasible and quality compliant with SNI
Weaknesses (W)	Household-scale business with limited capacity; simple technology; packaging and branding not yet optimal; lack of PIRT/Halal certification; limited capital for expansion
Opportunities (O)	Growth of West Sumatra tourism; increasing demand for healthy snacks; support from KUR and MSME empowerment programs; digital market and export opportunities
Threats (T)	Competition from other chip/snack products; fluctuations in cooking oil and raw material prices; changing consumer preferences; shrinking bengkuang cultivation land

Based on this SWOT matrix, four groups of strategies were formulated [6]: (1) **SO Strategy (Aggressive)**—developing premium products based on Padang's distinctive image, expanding digital markets, and strengthening branding as a signature souvenir icon; (2) **WO Strategy (Turnaround)**—modernizing production technology through the Micro KUR scheme (KUR Mikro, a micro-enterprise credit tranche of the government-subsidized KUR program), improving human resource competency, and redesigning packaging; (3) **ST Strategy (Diversification)**—differentiating products as natural and low in cholesterol, strengthening the supply chain through partnerships with farmer groups, and accelerating PIRT, Halal, and BPOM (National Agency of Drug and Food Control) certifications; and (4) **WT Strategy (Defensive)**—improving production efficiency, forming a cooperative/industrial cluster, and diversifying flavor variants. Because the underlying SWOT analysis was qualitative and not weighted, these four strategies are not presented as a quantitatively prioritized ranking. Rather, based on the constraints and expectations conveyed directly by the business owner and confirmed by the Padang City Office of Cooperatives and MSMEs, a suggested implementation sequence can be outlined qualitatively: obtaining PIRT/Halal certification and activating digital marketing in the short term (1–2 years), strengthening capital through Micro KUR and diversifying flavors in the medium term (3–5 years), and pursuing business scalability and export market penetration in the long term (>5 years). Establishing a quantitatively validated priority ranking would require a weighted approach such as SWOT–AHP or IFE/EFE scoring, which is recommended for future research.

3.6 Contribution to the Sustainable Development Goals

This study's findings connect concretely to four Sustainable Development Goals. For SDG 2 (Zero Hunger), transforming bengkuang, a locally grown tuber, into a shelf-stable processed food strengthens the local food system and adds a value-added food product to the community's food base. For SDG 8 (Decent Work and Economic Growth), the business's IDR 113,844 monthly net income and its reliance on hired processing labor demonstrate direct income generation and employment support at the household and micro-enterprise scale, even though the sensitivity analysis in Section 3.3 indicates that this income remains vulnerable to price fluctuations. For SDG 9 (Industry, Innovation, and Infrastructure), the shift from raw bengkuang

sales to a dough-based chip-processing technique represents a concrete step of agroprocessing and technological upgrading at the MSME level. For SDG 12 (Responsible Consumption and Production), the high value-added ratios obtained for both bengkuang (91.29%) and wheat flour (75.12%) demonstrate efficient utilization of agricultural raw materials, converting a perishable commodity into a higher-value, longer-shelf-life product and thereby reducing potential post-harvest loss.

4. CONCLUSION

Processing bengkuang into chips by the Jelly Snack'O business in Padang City generates a high-category value added, namely IDR 185,496.44/kg of bengkuang raw material (ratio 91.29%) and IDR 76,317.50/kg of wheat flour raw material (ratio 75.12%). The business is financially feasible, with an NPV of IDR 5,528,400, an IRR of 64.90%, a B/C Ratio of 1.10, and a payback period of ±17 months. The product quality meets all parameters of SNI 01-4305-1996, with a moisture content of 1.72% (maximum requirement 6.0%), an ash content of 1.51%, and an FFA content of 0.32%. The SWOT analysis produced four development strategies (SO, WO, ST, and WT), with a qualitatively suggested short-term step of pursuing PIRT/Halal certification and activating digital marketing. This study recommends synergy between business operators and the Padang City Government in developing the bengkuang chip agroindustry as one of Padang City's flagship products.

REFERENCES

[1] Pratiwi, P., Zulvera, Z., & Tanjung, H. (2021). Faktor-faktor yang berhubungan dengan keputusan petani dalam melakukan usahatani bengkuang di kecamatan kuranji kota padang. Joseta Journal of Socio-Economics on Tropical Agriculture, 3(2). https://doi.org/10.25077/joseta.v3i2.415

[2] Saputra, A., & Santosa, S. (2024). Simulasi dan penerapan linear programming dalam mengoptimalkan laba aktual vs optimal pada agroindustri rajo bengkoang. GreenTech, 1(2), 242-249. https://doi.org/10.25077/greentech.v1i2.24

[3] Megantara, I., & Sudiarta, I. (2023). Perbedaan kualitas keripik bengkuang dan keripik kentang. Jurnal Ilmiah Pariwisata dan Bisnis, 2(7), 1679-1684. https://doi.org/10.22334/paris.v2i7.492

[4] Hayami, Y., Kawagoe, T., Morooka, Y., & Siregar, M. (1987). Agricultural marketing and processing in upland Java: A perspective from a Sunda village. CPGRT Centre.

[5] Badan Standardisasi Nasional. (1996). SNI 01-4305-1996: Keripik singkong. Jakarta: Badan Standardisasi Nasional.

[6] Rangkuti, F. (2015). Analisis SWOT: Teknik membedah kasus bisnis (Edisi ke-20). Jakarta: PT Gramedia Pustaka Utama.

[7] Kasmir, & Jakfar. (2019). Studi kelayakan bisnis (Edisi ke-10). Jakarta: Kencana Prenada Media Group.

[8] Anggraini, S., & Hubeis, M. (2013). Analisis nilai tambah dan strategi pengembangan usaha keripik nangka CV Subur Jaya Kabupaten Pandeglang Provinsi Banten. Manajemen IKM: Jurnal Manajemen Pengembangan Industri Kecil Menengah, 8(2), 131-138.

[9] Mulyadi, & Sumardjo. (2017). Analisis nilai tambah agroindustri ubi kayu di Jawa Barat. Jurnal Penyuluhan, 13(1), 51-62.

[10] Rahmi, I., & Trimo, L. (2019). Nilai tambah pada agroindustri dodol tomat (Studi kasus pada Usaha Kelompok Wanita Tani Mentari Desa Genteng, Kecamatan Sukasari, Kabupaten Sumedang). Journal of Food System and Agribusiness, 3(1), 50-56.

[11] Sriagustini, P., Aviantara, I., & Sucipta, I. (2023). Studi nilai tambah komoditi buah stroberi pada tiara dewata distribution center Denpasar. Jurnal Beta (Biosistem dan Teknik Pertanian), 11(2), 272-281. https://doi.org/10.24843/jbeta.2023.v11.i02.p04

[12] Husnan, S., & Muhammad, S. (2014). Studi kelayakan proyek bisnis (Edisi Kelima). Yogyakarta: UPP STIM YKPN.

[13] Winarno, F. G. (2017). Kimia pangan dan gizi (Edisi Terbaru). Jakarta: PT Gramedia Pustaka Utama.

[14] Rahmadi, A. (2021). Evaluasi mutu keripik buah hasil penggorengan vakum berdasarkan SNI dan penerapannya sebagai acuan standar produk keripik umbi-umbian. Jurnal Teknologi Pangan dan Hasil Pertanian, 16(2), 45–54. https://doi.org/10.26623/jtphp.v16i2.3892

[15] Nurhasanah, Marlina, N., & Guntarti, A. (2018). Karakteristik fisik, kimia dan organoleptik produk olahan bengkuang. Jurnal Teknologi Pangan, 9(2), 128-135.