



## Steamed Mini Brownies with Sweet Potatoes: A Processed Food Business Innovation to Support Local Food Conservation

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### ABSTRACT

**Purpose of the study:** This study aims to develop a business plan for processed foods made from local tubers as a strategy for local food conservation, and to evaluate the success of the promotion through the implementation of the Mini Steamed Tuber Brownies business. The study also aims to assess consumer acceptance and the economic feasibility of the business as a basis for sustainable business development.

**Methodology:** Descriptive and action research methods were applied through semi-structured interviews, questionnaire surveys, strengths, weaknesses, opportunities, and threats analysis, break-even analysis, benefit-cost ratio analysis, and nonparametric statistical tests. Data processing used Microsoft Excel and SPSS. Research instruments included interview guidelines, observation sheets, promotional media, and respondent questionnaires.

**Main Findings:** The Steamed Tuber Mini Brownies product is suitable for consumption, production, and marketing. Promotional strategies are a key factor in increasing consumer acceptance. Female consumers and employees demonstrated higher levels of acceptance than other groups. Order-based sales yielded greater profits than individual sales. Economic analysis indicates that the business is feasible to continue, although it requires increased production efficiency and a strengthened marketing strategy.

**Novelty/Originality of this study:** The novelty of this research lies in the integration of local tuber conservation with the development and implementation of a home-based processed food business plan. This study not only assesses product potential but also directly measures promotional success and business feasibility, thus providing a practical model for local food development oriented toward conservation and economic sustainability.

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## 1. INTRODUCTION

Indonesia boasts abundant biological resources, including a variety of local tubers distributed throughout its regions. Local tubers such as sweet potato, taro, ganyong, arrowroot, suweg, and cassava have significant potential as alternative food sources [1], [2]. Their diverse nutritional content makes them suitable for development as high-value food ingredients [3], [4]. However, their utilization remains relatively low compared to wheat- or rice-based foods. This situation has led to the increasing marginalization of local tubers in the modern food system [5], [6].

Changing consumption patterns, which favor instant and imported foods, are a major challenge to preserving local tubers. Processed products made from wheat flour dominate the market due to their perceived convenience and modern image [7], [8]. On the other hand, local tubers are often perceived as traditional foods that are less appealing to the younger generation [9], [10]. This perception has resulted in declining public interest in consuming and processing local tubers. If this situation continues, the potential sustainability of local food resources could be threatened [11], [12].

Conservation of local tubers is not only related to germplasm preservation but also involves efforts to maintain food security based on local wisdom. One strategy that can be implemented is through the development of processed food innovations that can increase the added value of local tubers [13], [14]. These innovations need to be packaged attractively to compete in the modern market. Developing processed products can also expand the use of local tubers among various consumer groups [15], [16]. Thus, conservation can be achieved through a sustainability-oriented economic approach [17], [18].

Home industries are a potential business sector to support the development of processed products made from local tubers. The relatively small scale of these businesses allows for flexibility in production processes and product innovation [19], [20]. Furthermore, home industries can empower local communities by creating jobs and increasing family incomes [21], [22]. Developing home industries based on local tubers can also strengthen the regional creative economy [23], [24]. Therefore, initiating home industries is a strategic step in promoting local tuber conservation in a practical manner.

The success of a home industry is determined not only by product quality but also by thorough business planning. Business planning encompasses market analysis, marketing strategy, financial projections, and operational management [25], [26]. In the context of locally processed tuber products, business planning plays a crucial role in ensuring business sustainability while expanding the reach of conservation promotion [27], [28]. Without structured planning, business development risks stagnation or even failure. Therefore, integrating product innovation and business planning is fundamental [29], [30].

Various previous studies have discussed the potential of local tubers as alternative food ingredients and the development of diversified processed products [31], [32]. Other research has also highlighted the importance of community empowerment through local food-based micro-enterprises. However, most studies still focus solely on the technical aspects of product processing or nutritional content. Studies specifically integrating local tuber conservation with home industry initiatives based on business planning are still very limited. This demonstrates the need for research that connects conservation, entrepreneurship, and product promotion within a single, integrated framework.

Promoting conservation through the establishment of locally processed tuber food businesses is an innovative approach relevant to current community needs. This strategy not only encourages the preservation of local resources but also creates tangible economic value. Business realization allows communities to see the direct benefits of productively utilizing local tubers. Furthermore, the success of the promotion can be measured through market response to the implementation of the business. With this approach, conservation does not stop at the discourse level but is realized through sustainable economic activities.

Based on the literature review, a research gap exists in the lack of studies evaluating the effectiveness of local tuber conservation promotion through the concrete implementation of home industry business plans. Previous research generally only emphasizes the potential of raw materials or product formulations without measuring the success of conservation promotion through implemented business indicators. The novelty of this research lies in the integration of the concept of local food resource conservation with the development and implementation of a business plan for processed foods made from local tubers as a conservation promotion tool. The urgency of this research is heightened given the need for concrete strategies to maintain the sustainability of local food amidst the modernization of consumer consumption. Therefore, the main objectives of this study are to develop a business plan for processed foods made from local tubers as a local food conservation strategy and to evaluate the success of the promotion through the implementation of the Mini Steamed Tuber Brownies business. The research also aims to assess consumer acceptance and the economic feasibility of the business as a basis for sustainable business development.

## **2. RESEARCH METHOD**

### **2.1. Time and Place**

The research was conducted over a period of approximately ten months. The research activities were conducted at several business locations owned by female entrepreneurs in Malang City who served as interview respondents. The process of preparing a business plan and analyzing the feasibility of a processed food product business was carried out at the Animal Ecology and Diversity Laboratory, Faculty of Mathematics and Natural Sciences, Brawijaya University. Promotional activities were carried out in five faculties: the Faculty of Mathematics and Natural Sciences, Faculty of Economics, Faculty of Law, Faculty of Engineering, and Faculty of Medicine. Meanwhile, sales activities were carried out through four faculty canteens located at Brawijaya

University, including the Faculty of Mathematics and Natural Sciences, Faculty of Economics, Faculty of Engineering, and Faculty of Medicine in Malang City.

## 2.2. Object and Description of Study Area

This research was conducted in Malang City, a region in East Java Province with geographic conditions that support educational activities and business development. Malang City has an administrative area of approximately 114.65 square kilometers, divided into five sub-districts: Klojen, Sukun, Blimbing, Kedungkandang, and Lowokwaru. This strategic location makes it a suitable research location. The primary study area is Brawijaya University, located on Jalan Veteran, Malang City. This university is a state university with a large student population from various levels and faculties. The dynamic campus environment, along with the availability of a canteen and student activity center, make this location a potential location for the promotion and marketing of processed food products made from local tubers [33]. Therefore, this location was chosen to optimally support the research.

## 2.3. Preparing a Business Plan for Processed Local Tubers

The business plan was developed through several strategic stages. The initial stage involved gathering information about business development strategies from business owners in Malang City. Data was collected through semi-structured interviews using open-ended questions [34], [35]. Next, the business strategy was determined using an analysis of strengths, weaknesses, opportunities, and threats to identify potential business opportunities and obstacles. The results were then compiled and combined with secondary data to serve as a reference in designing a business plan for processed foods made from local tubers.

## 2.4. Successful Promotion through the Realization of Local Tubers Processed Food Business Plans

Promotional success was measured through the marketing and sales of steamed brownies made from local tubers. Promotional activities included the distribution of free samples, the distribution of information media, and the regular use of social networks in several faculties. Following the promotional phase, product sales were conducted in several faculty canteens deemed to have market potential. Promotional and sales evaluations were conducted periodically to determine consumer response to the product offered [36], [37]. A business feasibility test was conducted by distributing questionnaires to respondents consisting of students and staff to assess product acceptance. The research instrument underwent validity and reliability testing, thus establishing its suitability for use as an evaluation tool. Furthermore, an economic feasibility analysis was conducted using a break-even approach and a cost-benefit analysis. Observed variables included consumer acceptance, profits, and potential losses. The evaluation results were then used as a basis for improving and refining the business plan for processed local tuber foods.

## 2.5. Research Design

This research uses a descriptive approach through interviews with business owners to obtain information on their experiences and business development strategies. The business plan design was developed using action research methods [38], [39]. This method is implemented through the direct implementation of the prepared business plan. Furthermore, a feasibility study is conducted to assess the effectiveness of the business implementation. The evaluation results are used as a basis for refining the developed business plan.

## 2.6. Data Analysis

The data analysis in this study was conducted using a business financial analysis, which included calculations of fixed costs, variable costs, total production costs, production value, cost of goods sold, and operating profit. Furthermore, a break-even analysis was used to determine the minimum sales level to avoid losses. Business feasibility was also analyzed through a comparison of benefits and costs to determine the level of profit achieved [40], [41]. Sales data and questionnaires were then processed using data processing software. Statistical analysis was conducted to determine differences in consumer acceptance of local tuber processed food products. Testing was conducted using nonparametric tests based on the characteristics of the research data. The results of this analysis were used as a basis for evaluating the success of the promotion and the feasibility of the business being run.

## 3. RESULTS AND DISCUSSION

The strategies implemented in developing the local tuber brownie business include production, promotion, and sales strategies. These three strategies are designed to support the overall success of the business. However, based on an analysis of consumer interest in the new product, the promotion aspect is the primary focus of its implementation. This is because promotion plays a crucial role in introducing the product to

consumers. Therefore, the promotional strategy is prioritized to increase the product's appeal and market acceptance.

### 3.1. Production strategy

The main advantage of this brownie product lies in the use of local tubers as the main ingredient. Because this product is still relatively new, the production strategy involves several trials with recipe variations to achieve the best quality. The recipe development process is based on information and experience gained from business owners in Malang City. This step aims to create an innovative, high-quality product that suits consumer tastes. The tuber brownies are produced using local tuber flour without the addition of wheat flour, preservatives, or artificial colors. The use of these natural ingredients is expected to increase public interest in healthy food consumption [42]. Furthermore, the easily digestible and gluten-free nature of local tubers provides added health value. The use of local tubers also supports food diversification while introducing alternative foods with high nutritional value. Therefore, the production strategy focuses on product quality, innovation, and health benefits.

### 3.2. Promotion strategy

This product is named Mini Brownies Kukus Umbi (Steamed Tuber Mini Brownies) as an identity that distinguishes it from similar products on the market. The product name is designed to be easily recognized while attracting consumer attention. The promotional strategy implemented refers to the business owner's experience, namely through disseminating information media, utilizing social media, providing free samples, and word-of-mouth promotion. Promotional media were chosen because they can reach a wide consumer base at a relatively affordable cost. Providing free samples is done so that consumers can directly learn about, try, and assess the product's quality. This method is considered effective because it can build consumer interest through direct experience. Furthermore, promotion through social media provides broader and faster marketing opportunities. Word-of-mouth strategies are also utilized because recommendations from satisfied consumers tend to be more trusted. Thus, promotions are focused on increasing product awareness and building consumer trust in brownies made from local tubers.

### 3.3. Packaging Strategy

The packaging strategy is tailored to the product's sales type. Individual products are packaged in paper cups, while custom-made products are packaged in transparent plastic containers. This packaging choice aims to maintain product quality while providing a more attractive appearance. Neat and practical packaging is expected to increase consumer appeal. Thus, packaging is one way to enhance the selling value of brownies made from local tubers.

### 3.4. Sales Strategy

Cassava brownies are marketed in two formats: individually sold and made to order. Pricing is determined by considering product quality and adjusting to consumer purchasing power, particularly students as the primary target market. The product is marketed by students, who are considered to have extensive social networks and effective communication skills in promoting the product. The sales strategy focuses on selecting strategic locations, namely canteens in several faculties, which serve as centers of student activity. These locations were chosen because they have high market potential and are easily accessible to consumers. Furthermore, the product's advantage lies in the use of local cassava composite flour as the main ingredient, providing a differentiating value compared to typical brownies. Therefore, the sales strategy is aimed at increasing competitiveness and expanding the product's market reach.

### 3.5. Promotional Success and Business Feasibility of Steamed Tuber Brownies

Based on the results of a questionnaire involving thirty respondents, consisting of students and staff from the Faculty of Mathematics and Natural Sciences, with a composition of female and male respondents, the results showed no difference in the level of acceptance of cassava brownies based on gender. This indicates that the product is well-received by both male and female consumers. These findings indicate that brownies made from local cassava have a relatively equal appeal among both consumer groups.

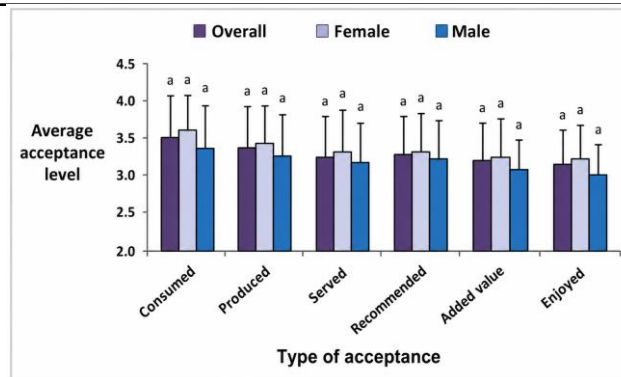


Figure 1. Differences in acceptance of steamed mini brownies by male and female consumers

Female consumers showed a higher level of acceptance than male consumers for steamed brownies made from local tubers. This finding suggests that female consumers could be a primary target market, similar to female employees, university students, and housewives. Overall, the average product feasibility score indicates that tuber brownies are suitable for consumption, production, marketing, recommendation, and even gifting. However, the level of acceptance among male consumers remains relatively low, necessitating further evaluation to increase the product's appeal to this group. Furthermore, although the product is deemed feasible for production and marketing, consumer skepticism remains, indicating the need for quality improvement and marketing strategies.

Evaluation results by consumer group indicate differences in acceptance levels between students and employees. Employees assessed tuber brownies as suitable for consumption, production, marketing, recommendation, and widespread acceptance. This assessment is also supported by direct orders during promotional activities involving free samples. Meanwhile, students assessed that the product still requires further evaluation, particularly in terms of marketing. These findings indicate that employees have greater potential as a primary market segment in developing the tuber brownie business.

On the other hand, female entrepreneurs tend to provide more critical assessments of product feasibility. This is likely because they have more extensive experience in the business world, enabling them to assess business potential and challenges more objectively. According to them, new products like sweet potato brownies still require continuous development and regular evaluation before they can be widely accepted. This assessment provides crucial input for refining business strategies. Thus, evaluations from various consumer groups can inform more effective product development and marketing directions.

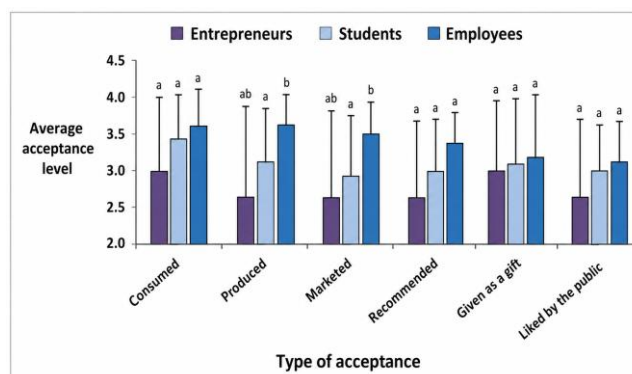


Figure 2. Differences in acceptance of mini steamed brownies by entrepreneurs, students and employees

Bookkeeping plays a crucial role in assessing a business's economic potential, as it includes information on available capital, additional funding requirements, business feasibility, and profit and loss calculations. Based on the results of individual brownie sales, it was found that revenue, expenses, and profit decreased after the evaluation. This decrease was influenced by the reduced number of sales and the adjustment of the selling price after the evaluation. Despite this, the business still generated a profit, although the profit percentage decreased. This situation indicates that pricing should not only consider profit targets but also be adjusted to market prices and consumer purchasing power.

In contrast to individual sales, sales of custom-made brownies showed an increase in revenue, expenses, and profit after the evaluation. This increase occurred because the evaluation focused not only on economic aspects but also on taste quality, product appearance, and consumer response. Despite the increase in selling price, profits actually increased due to improvements in product quality and more effective promotional

strategies. Furthermore, longer lead times after the evaluation contributed to the increase in sales. These results demonstrate that ongoing evaluation can improve customer satisfaction while strengthening business profitability.

Based on the results of an economic feasibility analysis using a benefit-cost ratio, the mini steamed brownie business made from local tubers was deemed feasible to continue, as the ratio was above one. However, the relatively low ratio indicates that the profit margin is still limited and tends to approach production costs. This indicates that the business still requires efficiency improvements to generate optimal profits. To reach the initial payback point, a minimum sales volume is required, as calculated from the break-even point. Therefore, business sustainability depends heavily on the ability to maintain consistent sales volume.

The analysis showed that selling individual brownies requires a longer payback period than selling custom-made brownies. Conversely, custom-made sales provide a faster return on investment and higher monthly profits. This indicates that consumers are more interested in purchasing custom-made products, especially during certain times. This increased interest is also supported by the use of tuber flour compositions that better align with consumer preferences after evaluation. These findings emphasize the importance of regular evaluation to improve product quality and adapt it to market needs.

Although the business has demonstrated profit potential, the profit margin is still relatively low, necessitating further development strategies. One recommendation is to adjust selling prices while still considering consumer purchasing power. Furthermore, production cost efficiencies can be achieved by substituting raw materials with more economical alternatives without compromising product quality [43]. This step is crucial to ensure prices remain affordable for a wide range of consumers. With this strategy, it is hoped that the tuber brownie business can grow sustainably and reach a wider market.

This research confirms that local food conservation can be achieved through a more practical approach, namely by integrating food product innovation with entrepreneurial strategies. Processing local tubers into modern products such as mini steamed brownies demonstrates that efforts to preserve traditional food sources need not be limited to education or consumption campaigns alone, but can be realized through product diversification that aligns with today's consumer preferences. This approach aligns with the concept of conservation based on sustainable use, where the resulting economic value serves as an incentive for communities to continue utilizing and preserving local commodities. These findings reinforce the view that product innovation based on local resources is an effective strategy to counter the dominance of imported food ingredients in the modern market.

Furthermore, this research demonstrates the importance of marketing strategies in building positive perceptions of local foods. One of the main challenges in developing tuber-based products has been the stigma that local foods tend to be traditional and unappealing to the younger generation. Therefore, transforming tubers into products with a modern appearance and attractive packaging is a strategic step in changing this perception. Promotional strategies involving direct interaction with consumers also demonstrate that the experience of trying the product directly has a significant impact on building consumer trust in the quality of new products [44], [45]. This demonstrates that the success of local food promotion is significantly influenced by the business owner's ability to create a positive consumption experience.

From a business development perspective, this study demonstrates that the success of local food businesses depends heavily on the flexibility to adapt production and marketing strategies to market needs. Regular evaluation of taste, texture, appearance, and sales patterns is a crucial component in ensuring business sustainability. In the context of micro-businesses, this adaptability is a crucial indicator for maintaining competitiveness. This study also confirms that local food-based businesses require business planning that focuses not only on production aspects but also on market analysis and consumer behavior.

Furthermore, the research findings provide a theoretical contribution to the development of local food conservation studies by positioning entrepreneurship as a conservation instrument. To date, most research on local tubers has focused primarily on nutritional content, product formulation, or cultivation techniques. This study broadens this perspective by demonstrating that the preservation of local food resources can be strengthened through market mechanisms. Thus, conservation is understood not only as an effort to maintain the existence of commodities but also as a process of increasing their economic and social relevance amidst changing consumption patterns.

This research has significant practical implications, particularly for the development of micro-enterprises based on local food. The developed business model can serve as a reference for small business owners and communities seeking to develop innovative products using local ingredients with relatively affordable capital. Implementing this strategy has the potential to create new business opportunities, increase the added value of local tuber commodities, and expand the market for alternative food products. In the long term, this could encourage the growth of a creative economy based on local resources.

Furthermore, this research also has social and educational implications. The introduction of more modern tuber products can raise public awareness, particularly among the younger generation, of the importance of food diversification and food security based on local resources. If developed more widely, this innovation

could support the national agenda of reducing dependence on imported food ingredients and strengthening the culture of local food consumption as part of Indonesia's culinary identity.

Despite its important contribution, this study has several limitations. First, the relatively limited number of respondents and focus on the university environment mean that generalizing the results to a broader population requires caution. Consumer preferences in academic settings may not necessarily represent the characteristics of consumers from different age groups, economic backgrounds, or geographic regions. Second, the limited duration of the study does not allow for a long-term evaluation of business sustainability. Factors such as changing market trends, fluctuations in raw material prices, competition from similar products, and consistency of consumer demand could not be comprehensively observed. These aspects are crucial for the sustainability of local food-based businesses. Third, this study focuses on a single product innovation: steamed mini brownies made from local tubers. A wider variety of products needs to be explored to determine the potential acceptance of local tubers in other processed forms. Furthermore, this study does not fully examine the effectiveness of utilizing broader digital platforms, such as marketplaces and marketing strategies based on social media analytics, which are currently crucial factors in the development of modern food businesses.

#### 4. CONCLUSION

Based on the research results, the development of the Mini Steamed Tuber Brownies business through production, promotion, packaging, and sales strategies has proven to have good potential as an effort to conserve local tubers while developing processed food businesses. Promotional strategies are the most dominant factor in increasing product recognition and acceptance, especially through the provision of free samples, social media, and word-of-mouth promotion. This product is considered suitable for consumption, production, marketing, recommendations, and even as a gift, with a relatively good level of acceptance among various consumer groups, especially employees and female consumers as potential market segments. An economic feasibility analysis shows that this business is feasible to continue even though the level of profit obtained is still relatively limited, so that it is necessary to improve production efficiency and a more optimal marketing strategy. Order-based sales show more profitable results than individual sales, so it can be a focus for future business development. Overall, the realization of the business plan for processed foods made from local tubers has proven to be able to support the promotion of local food conservation, but still requires continuous evaluation and innovation to be able to develop competitively and sustainably in the market. Further research is recommended to involve a larger number of respondents with more diverse demographic characteristics in order to obtain a more representative picture of the level of consumer acceptance of local tuber-based processed products.

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#### AUTHOR CONTRIBUTIONS

Conceptualization, J.M.; Methodology, J.M.; Software, J.M.; Validation, J.M.; Formal Analysis, J.M.; Investigation, J.M.; Resources, J.M.; Data Curation, J.M.; Writing – Original Draft Preparation, J.M.; Writing – Review and Editing, J.M.; Visualization, J.M.; Supervision, J.M.; Project Administration, J.M.; Funding Acquisition, J.M.

#### CONFLICTS OF INTEREST

The authors declare no conflict of interest.

#### USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

Not applicable.

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