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UTILIZATION OF PURPLE SWEET POTATO (Ipomoea batatas blackie) AS RAW INGREDIENT IN PIZZA PRODUCTION

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ABSTRACT

Indonesia remains highly dependent on wheat imports, reaching 7.39 million tons annually, threatening national food security. Additionally, this heavy reliance on wheat imports can jeopardize economic stability, as wheat prices are controlled by producing countries. Therefore, it is essential to find local food alternatives that can replace wheat, one of which is purple sweet potato (Ipomoea batatas Blackie), which is widely available in Indonesia. This study explores the potential of purple sweet potato as an alternative raw ingredient in pizza production to reduce dependence on wheat imports. The research employs an experimental method with qualitative and quantitative analysis. Pizza was prepared by partially substituting wheat flour with purple sweet potato, followed by an organoleptic test conducted by 20 panellists to evaluate taste, texture, aroma, color, and presentation. The results indicate that purple sweet potato pizza has a balanced nutritional composition, containing 250 kcal of energy, 40g of carbohydrates, 6g of protein, 8g of fat, 3g of fiber, 500IU of vitamin A, and 10mg of vitamin C per 100g. Market response to this product was highly positive, with an average overall score of 4.38 out of 5, indicating good consumer acceptance. The substitution of purple sweet potato in pizza not only enhances nutritional value but also offers a more sustainable local food alternative. This study concludes that this innovation has the potential to be developed within the food industry, support food diversification, and reduce reliance on imported wheat flour.

Keywords: Food Security, Pizza, Product Innovation, Purple Sweet Potato, Response.

INTRODUCTION

Indonesia, as an agrarian country, possesses significant agricultural potential. However, the agricultural sector's capacity to meet domestic food demand has experienced a substantial decline (Siringo & Daulay, 2014). This trend is reflected in the increasing volume of food imports each year (Azzahra et al., 2021; Ariska & Qurniawan, 2021), which presents an irony for a nation endowed with vast and fertile land. Indonesia imports various staple food commodities in large quantities, including rice, corn, soybeans, granulated sugar, salt, and wheat (Saputra & Setyowati, 2024). Among these, wheat imports have reached the highest volume, amounting to 7.39 million tons (Fadilah & Supriyadi, 2022), indicating a chronic dependence on this commodity. Wheat has become the second staple food after rice and is widely consumed in the form of bread, noodles, cakes, and other processed food products (Dewandari et al., 2023).

The high dependence on wheat imports poses a threat to national economic stability, as wheat prices are controlled by

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producing countries (Moningka et al., 2025). As a consumer nation, Indonesia is compelled to accept the prices set by exporting countries, which can place a significant strain on the national budget. Therefore, efforts are needed to identify local food alternatives that can substitute for wheat, one of which is the development of tuber-based crops. Sweet potato (*Ipomoea batatas* L.), particularly the purple variety, is a cultivated crop with significant potential as a local food source (Pratiwi, 2020; Sumarjan et al., 2020). Rich in carbohydrates, sweet potatoes have served as a staple food in several countries, including those in Africa (Umar et al., 2022). In Indonesia, however, sweet potato processing remains relatively basic and is primarily conducted on a small scale (Antriyandarti & Wati, 2021). Diversifying its processed products must be promoted to enhance sweet potato consumption. Sweet potato-based products can be developed in various forms, including fresh, ready-to-eat, ready-to-cook, and semi-processed products.

Pizza, an Italian dish primarily made from wheat flour, is widely popular across the globe. The combination of additional ingredients such as vegetables, cheese, and various spices not only enhances its flavor but also serves as a significant energy source (Powell et al., 2015). The innovation of Purple Sweet Potato Pizza presents a promising business opportunity, offering high market value and a distinctive taste derived from purple sweet potatoes. Utilizing sweet potatoes as a base ingredient can help reduce production costs in the food industry, particularly for businesses that rely on wheat flour (Histifarina et al., 2023).

Furthermore, purple sweet potatoes are inherently halal, ensuring consumer confidence in predominantly Muslim markets such as Indonesia (Setiawan et al., 2024). Additionally, promoting the use of purple sweet potatoes is expected to contribute to reducing Indonesia's increasing reliance on wheat flour imports. This study explores the potential of purple sweet potatoes as an alternative raw ingredient or material in pizza production to decrease wheat import dependency and enhance food security in Indonesia.

RESEARCH METHODS

This study employs an experimental method with a mixed research design, integrating both qualitative and quantitative analysis techniques (Östlund et al., 2020). The experimental approach is applied in the development of Purple Sweet Potato Pizza, where various variables, including ingredient composition and processing techniques, are tested to achieve optimal results. The analytical techniques involve the collection of primary data through surveys and interviews. Surveys are distributed to respondents who have consumed the pizza to assess market response to this innovation. Additionally, interviews are conducted with experts in food processing to gain in-depth insights into techniques and innovations in pizza production. Observations and documentation are also carried out to record each stage of the production process and the final product outcome. The collected data are analyzed to evaluate the potential of purple sweet potato as an alternative raw ingredient in pizza production and to assess consumer acceptance of this product.

Tools and Ingredients

The equipment utilized in this study includes a pot, oven, scissors, knife, wooden pestle, pizza tray, cutting board, and LPG stove. These tools were selected based on the requirements of the Purple Sweet Potato Pizza production process, which involves multiple stages, from ingredient preparation to baking. The primary ingredient used is purple sweet potato (*Ipomoea batatas blackie*), sourced from Beringharjo Market, Yogyakarta. Additional ingredients include 100 grams of wheat flour, 40 grams of margarine, 2

eggs, 8 grams of yeast, 50 grams of sugar, 1 tablespoon of milk, 10 ml of water, 40 grams of cornstarch, 50 grams of cheese, ½ onion, 2 sausages, and 150 grams of Bolognese sauce. This combination of ingredients is formulated to create a flavorful and nutritionally rich pizza dough, highlighting the distinct taste of purple sweet potato.

Purple Sweet Potato Pizza Making Process

The production process of Purple Sweet Potato Pizza begins with ingredient preparation, where the purple sweet potatoes are peeled, sliced, and mashed using a wooden pestle. The mashed sweet potatoes are then combined with wheat flour, margarine, eggs, yeast, sugar, milk, water, and cornstarch to form a dough. The dough is kneaded until smooth and left to rise for a specified period. Once the dough has risen, it is shaped into a pizza base and placed on a baking tray. Toppings, including cheese, onion, sausage, and Bolognese sauce, are then added. The pizza is subsequently baked in an oven at a predetermined temperature until fully cooked. The detailed step-by-step process of Purple Sweet Potato Pizza preparation is illustrated in Figure 1.

Then, the final product of sweet potato pizza is evaluated based on its taste, texture, aroma, color, and overall appearance to ensure it meets the expected quality standards. Consumer acceptance is further assessed through respondent evaluations (Khosyiati et al., 2024).

Figure 1. Purple Sweet Potato Pizza Making Process

RESULTS AND DISCUSSION

Processing of Purple Sweet Potatoes

Purple sweet potato (*Ipomoea batatas blackie*) is a local food source with significant potential to enhance both nutritional value and economic opportunities for communities. Its rich nutritional profile, particularly in carbohydrates, minerals, and vitamins, makes it an appealing alternative food source. Increasing public awareness of its health benefits, particularly as a functional food with positive health effects, has further highlighted its potential. However, at the household level, purple sweet potato processing remains limited to basic methods such as boiling, steaming, or frying, which results in a low market value. Therefore, innovation in purple sweet

potato processing is essential to enhance its economic value.

In the context of food diversification, developing processed products such as Purple Sweet Potato Pizza represents a strategic initiative. The relatively simple processing method and the accessibility of affordable raw ingredients create opportunities for businesses to produce this innovative product. Utilizing purple sweet potato as a base ingredient not only offers a distinct flavor but also provides high nutritional value. Furthermore, expanding the range of processed products, such as Purple Sweet Potato Pizza, can enhance consumer appeal and broaden market reach, ultimately generating positive economic impacts, particularly in rural areas.

Purple Sweet Potato Pizza Formula

The formulation for Purple Sweet Potato Pizza is designed to produce a flavorful and nutritionally balanced product. The detailed composition of the pizza ingredients is presented in Table 1. For a single tray of Purple Sweet Potato Pizza, the ingredients include 300 grams of purple sweet potato, 100 grams of wheat flour, 40 grams of margarine, 2 eggs, 8 grams of yeast, 50 grams of sugar, 1 tablespoon of milk, and 10 milliliters of water.

The preparation process begins with washing and steaming the purple sweet potatoes for 15 minutes, followed by mashing them until smooth. Subsequently, all ingredients are combined and kneaded until a homogeneous dough is achieved. The dough is then left to rise for 15 minutes before being shaped and topped.

Table 1. Purple Sweet Potato Pizza Recipe for one Pizza Pan

Ingredients	Formula
Purple Sweet Potato	300 gr
Flour	100 gr
Margarine	40 gr
Egg	2 eggs
Yeast	8 gr
Sugar	50 gr
UHT Cow Milk	1 tablespoon
Water	10 ml

The toppings for Purple Sweet Potato Pizza can be customized based on preference; however, they typically include Bolognese sauce, onion, sausage, and cheese. The baking process is carried out at a temperature of 200°C for 20 minutes. With this formulation, Purple Sweet Potato Pizza not only offers a distinct flavor profile but also serves as a healthier alternative to conventional wheat flour-based pizzas. This innovation is expected to attract health-conscious consumers and those seeking greater dietary diversity while also adding value to processed purple sweet potato products.

Purple Sweet Potato Pizza Nutritional Content

The nutritional content of the Purple Sweet Potato Pizza is important to know and understand, specifically in the context of health and nutrition. Nutritional testing was conducted using laboratory analysis methods, which included testing for carbohydrate, protein, fat, fiber, and vitamin levels. The results of the testing indicate that the Purple Sweet Potato Pizza has a well-balanced nutritional composition, with a high carbohydrate content, adequate protein, and fats and fiber that contribute to health benefits. Table 2 presents the results of the nutritional content analysis per serving of the Purple Sweet Potato Pizza.

Table 2. Nutritional Components Amount per Serving (100g)

Nutritional Components	Amount per Serving (100g)
Energy	250 kcal
Carbohydrate	40 g
Protein	6 g
Fat	8 g
Fiber	3 g
Vitamin A	500 IU
Vitamin C	10 mg

The high nutritional content of Purple Sweet Potato Pizza makes it a healthy and nutritious food choice. Purple sweet

potatoes are rich in beta-carotene, which acts as a precursor to vitamin A, and contain antioxidants that help combat free radicals in the body. Thus, the consumption of Purple Sweet Potato Pizza not only provides energy but also supports overall health, making it a superior alternative compared to other processed foods.

Market Response to Pizza Product

Market response to the Purple Sweet Potato Pizza product is crucial for evaluating its potential success in the marketplace. To assess this response, a survey was conducted by distributing product samples to respondents and distributing questionnaires to collect data on their evaluations of the taste, texture, aroma, color, and presentation of the Purple Sweet Potato Pizza. The results of the questionnaire revealed that most respondents gave positive feedback on the taste and presentation of the product, with several panellists stating that the flavor of the Purple Sweet Potato Pizza was very delicious and appealing. Table 3 presents the data obtained from the market response to the product concerning the purple sweet potato pizza. This data includes evaluations from 20 panellists.

Table 3. Panellist Response to Purple Sweet Potato Pizza

Panellist	Taste (1-5)	Texture (1-5)	Aroma (1-5)	Color (1-5)	Appearance (1-5)	Total Score	Average Score
1	4	4	4	5	4	21	4.2
2	5	5	4	4	5	23	4.6
3	4	4	5	4	4	21	4.2
4	3	4	4	5	4	20	4
5	5	5	5	5	5	25	5
6	4	4	4	4	4	20	4
7	4	5	4	5	4	22	4.4
8	5	5	5	5	5	25	5
9	4	4	4	4	4	20	4
10	3	4	4	5	4	20	4
11	5	5	5	5	5	25	5
12	4	4	4	4	4	20	4
13	4	5	4	5	4	22	4.4
14	5	5	5	5	5	25	5
15	4	4	4	4	4	20	4
16	3	4	4	4	4	19	3.8
17	5	5	5	5	5	25	5
18	4	4	4	4	4	20	4
19	4	5	4	4	4	21	4.2
20	5	5	5	4	5	24	4.8
Total						**438**	**87.6**
Average						**21.9**	**4.38**

Based on Table 3, the market response to the Purple Sweet Potato Pizza indicates promising results. With a total score of 438 and an average score of 4.38 out of 5, along with an acceptance rate of 83%, the majority of panelists provided positive evaluations. This survey assessed the taste, texture, aroma, color, and presentation of the product, highlighting that this innovation has significant potential for acceptance in the market and could become a popular choice among Indonesian consumers.

Figure 2 presents a graph of the panellists' responses, illustrating the data analysis results from the survey. This graph demonstrates the variation in responses from the panellists to the questions posed, providing essential insights into their perspectives and enabling more informed decision-making based on the available data.

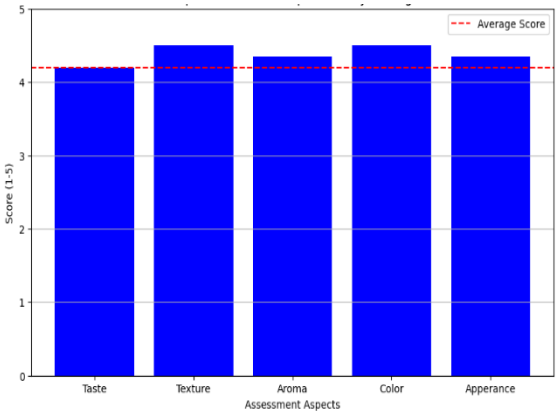

Figure 2. Panellist Response Graph

The assessment of product innovation received a positive response from the panellists, indicating that Purple Sweet Potato Pizza has the potential to be well received in the market. Purple Sweet Potato Pizza is expected to be widely known and become a choice for consumption by the Indonesian people.

CONCLUSION

This study demonstrates that purple sweet potato (*Ipomoea batatas blackie*) holds significant potential as an alternative raw ingredient for pizza production. Given Indonesia's increasing dependence on wheat imports, the development of purple sweet potato-based products presents a strategic solution to enhance national food security. The production process of Purple Sweet Potato Pizza in this study employed an experimental method, testing various ingredient compositions and processing techniques.

The findings indicate that the resulting pizza not only offers a rich and appealing flavor but also possesses high nutritional value, making it a healthier alternative to conventional wheat flour-based pizza. The nutritional composition of Purple Sweet Potato Pizza exhibits a well-balanced ratio of carbohydrates, proteins, fats, and vitamins, which are essential for consumer health. Furthermore, market response surveys revealed a positive reception, with most panellists rating the product highly in terms of taste, texture, aroma, color, and presentation. With an average score of 4.38 out of 5, this product demonstrates strong market potential, which could encourage food industry stakeholders to scale up production and commercialization of Purple Sweet Potato Pizza.

The benefits of this study are not limited to increasing the consumption of purple sweet potatoes but also contribute to the diversification of processed products that can enhance the economic value of local communities, particularly in rural areas. Therefore, the development of purple sweet potato-based products is expected to reduce dependence on imported food, support food security, and provide healthier alternatives for the Indonesian population. Further research is needed to explore other potential uses of purple sweet potatoes and additional processed products that can be developed to improve food diversity in Indonesia.

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