

The Use of Taro as A Potato Substitute and The Addition of Aglio Olio Sauce in The Manufacture of Gnocchi

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ABSTRACT

Keywords: Taro, potatoes, gnocchi, aglio olio sauce, innovative food products, sustainable

This research aims to explore the utilization of taro as a substitute for potatoes in making gnocchi and the addition of aglio olio sauce to enhance taste and texture. The research findings indicate that taro can be used as a substitute for potatoes with a relatively high level of acceptability. The addition of aglio olio sauce also enhances the overall taste and aroma of gnocchi. This research contributes to the development of innovative and sustainable food products, offering a new perspective on the utilization of lesser-used plants in the culinary industry. This research is an experimental study. Taro was chosen as the raw material because, although it has many benefits and is underutilized, it has a high nutritional value. The organoleptic test of the taro utilization as a substitute for potatoes and the addition of aglio olio sauce in the production of gnocchi was conducted using a Likert scale from 1 to 5, with higher values indicating better quality. The panel consisted of 20 members of the public, with an equal number of men and women and an average age of 30 years. They were randomly selected and had no special skills in the culinary field. The product received good ratings in terms of sensory taste, such as spicy, sweet, sour, savory, and general. The findings of this study are that the optimal process of utilizing taro as a substitute for potatoes and adding aglio olio sauce in the production of gnocchi requires a series of meticulous and efficient steps. From the soaking and cleaning stages to the serving stage, each step must be carefully executed to ensure the quality of the final product.



Introduction

Food is the main human need and continues to increase as the population grows. Food needs can be met from existing natural resources, especially from the plant group (Nurchayati & Ardiyansyah, 2019). The fact that the staple food of the Indonesian population depends on a single source of carbohydrates that can weaken food security and faces difficulties in its procurement today shows that meeting the food needs of people across the region at all times according to their diet and desires is not an easy task. The increasing population in Indonesia affects the food needs of various traditional events

or celebrations (Fauzi & Kurniawan, 2024). Examine the market potential for taro-based products and their impact on the local culinary industry.

One of the food sources used by the plant group is *Colocasia esculenta* (L.). School is commonly known as taro. Examine the use of taro in manufacturing modern food products, including pasta and gnocchi (Maharani, 2021). Taro is a tuberous plant whose use is still very limited and even increasingly displaced by other types of tubers. In Indonesia itself, taro, especially in rural areas, is widely used as the main raw material to replace rice and interlude food, and it is even allowed to grow. In addition, taro can also be used as processed food, such as taro chips, getuk, and onde-onde, and even some Indonesian people make taro for the manufacture of taro flour, which can then be processed into noodles or cakes (Suhartono, 2019). Taro has great potential as an alternative food ingredient that is rich in nutrients.

Taro can be processed using various processing techniques, such as frying, steaming, boiling, or burning. In addition, taro is also often processed into various types of processed taro that we often encounter, such as chips, talam, compote and so on, from which we can conclude that taro is usually only processed as a local or traditional food. According to Hembing Wijayakusuma, (2002), Taro tubers contain iron, calcium, phosphate, and protein, as well as vitamins A and B, which makes them a healthy alternative to potatoes in food products. The high fiber content is also beneficial for digestion, making it a better choice in a health context. Therefore, a new way is needed to process taro so that people are more interested in consuming it. This also increases food diversity and inspires culinary innovation. One way is to combine processed taro with processed gnocchi with aglio olio sauce so that it becomes more attractive. Pasta is a food originating from Italy that is quite popular in Indonesia, and we can find it anywhere. Pasta can be a substitute for rice as a source of carbohydrates. In European countries, pasta is the main food ingredient. Pasta has become a favorite food for many people because of its practicality, ease of storage, and universal taste, which makes it easy for everyone to accept it. Gnocchi is one of the various types of pasta called gnocchi because of its small clumps, like snails. The Use of Taro as a Potato Substitute and the Addition of Aglio Olio Sauce in Making Gnocchi Gnocchi is a type of Italian pasta; Aglio Olio sauce is a classic pasta sauce made from garlic and olive oil. According to Segari (2022), it is made from the basic ingredients of potatoes and wheat flour. However, the majority of Indonesians are still not very familiar with gnocchi, and gnocchi is rarely found in Italian restaurants in Indonesia. Therefore, the author made a gnocchi test by replacing the base ingredient with taro. The purpose of this trial is to introduce gnocchi, find out if taro can be used as a basic ingredient for making gnocchi, and find out the level of preference for gnocchi that uses taro in terms of texture, taste, aroma, and color. In this study, the author uses taro as a material for making gnocchi. Research conducted by Wahyuningtias et al. (2021) also includes an analysis of the quality of gnocchi produced from taro compared to potatoes. Using the experimental method.

Food is a primary human need that continues to increase with population growth. Meeting food demands, especially from plant-based sources, is crucial to ensuring food

security. One of the underutilized plant sources is taro (*Colocasia esculenta*), a tuber with high nutritional value, including iron, calcium, and vitamins A and B, as well as dietary fiber. Despite its potential, taro is often overshadowed by other tubers like potatoes, limiting its application in modern culinary products (Pagán-Jiménez & Mickleburgh, 2023; Suhartono, 2019; Wijayakusuma, 2002).

Previous studies have explored taro's use in traditional and modern food products. For instance, Suhartono (2019) demonstrated taro's potential in traditional snacks like *getuk* and *onde-onde*, while Maharani (2019) investigated its application in pasta products. Similarly, Wahyuningtias et al. (2023) analyzed the sensory qualities of gnocchi made from taro and reported promising results regarding texture and taste. However, these studies often focus solely on the nutritional and sensory aspects without integrating complementary culinary elements, such as sauces, to enhance the overall gastronomic experience.

This research introduces a novel approach by not only substituting potatoes with taro in gnocchi production but also incorporating aglio olio sauce to improve the taste profile and culinary appeal. Unlike previous studies, which mainly emphasize the functional and nutritional properties of taro, this study combines these aspects with flavor innovation to create a more holistic and market-ready food product. By integrating taro with aglio olio sauce, this research addresses gaps in flavor diversity and consumer acceptability that are less explored in prior studies.

Moreover, this study provides a comparative perspective on the sensory qualities of taro-based gnocchi versus traditional potato-based gnocchi, offering new insights into optimizing taro utilization in modern cuisine. This differentiation not only highlights the novelty of this research but also underscores its significance in promoting sustainable and innovative food products.

In accordance with the explanation in the background above, the research has Problem limitations, namely: : The number of taro available is inconsistent or limited, limiting the production of taro as a potato substitute in the manufacture of gnocchi. The technology required to process the production of Taro as a potato substitute in gnocchi manufacturing has not been tested or is expensive, limiting production efficiency. Producing taro products as a potato substitute in gnocchi manufacturing with satisfactory taste, texture, and nutritional value can be challenging, limiting consumer appeal to the product. The marketing of taro products as a potato substitute for gnocchi can face obstacles in gaining wide market acceptance, limiting the product's potential for success. Limitations of Previous Research: The lack of relevant research or available data on the use of Taro production as a potato substitute in gnocchi manufacturing may limit further understanding and development in this area.

The purpose of the research, in accordance with the explanation in the formulation of the problem above, is to find out if taro can be used as an alternative raw material for gnocchi and to determine the sensory quality (taste, aroma, color, texture) of potato substitution in the manufacture of Gnocchi.

Method

Research Methods: The following are research methods that can be used for research on the Utilization of Taro as a Potato Substitute and the Addition of Aglio Olio Sauce in the Making of Gnocchi:

Purpose and Focus

- **Objective:** To find out how the use of taro as a potato substitute and the addition of aglio olio sauce can improve the quality and acceptability of gnocchi. To examine consumer acceptance of pasta products that use local ingredients, including taro (Setiawan, 2021).
- **Focus:** Investigating the effect of taro flour substitution on gnocchi quality and the addition of aglio olio sauce on gnocchi taste and aroma.

Research Methods

- **Research Methods:** A fully randomized design (RAL) experiment consisting of four treatments and three replicates.
- **Variable:**
Independent Variable (X): Taro flour substitution of 0%, 25%, 50%, and 75%.
Bound Variable (Y): The quality of gnocchi, which includes shape, color, texture, aroma, and taste.

Samples and Sampling Techniques

- **Sample:** 120 copies of gnocchi made with taro flour substitution and the addition of aglio olio sauce.

Sampling Technique: Samples were distributed to 20 panelists from the general public.

- **Research Procedure:**
 1. Gnocchi Manufacturing:
 2. Addition of Aglio Olio Sauce: Aglio olio sauce is added to gnocchi made with taro flour substitution.
 3. Organoleptic Test: The organoleptic test was carried out by 20 panelists from the general public who gave answers to a questionnaire consisting of 5 items: shape, color, texture, aroma, and taste.

Data Analysis:

The data obtained from the organoleptic test were analyzed using the Multiple Range Test (DMRT) method.

Organoleptic Table of Multiple Range Test (DMRT) Method for Research on the Utilization of Taro as a Potato Substitute and Addition of Aglio Olio Sauce in the Making of Gnocchi:

Variable	Ranking	Total	Mean	SD	Q-value	Significant Difference
Bentuk	1	39.3	2.5	1.2	4.34	39.3 > 20.7, 39.3 > 11.3
	2	20.7	1.8	0.8	3.46	20.7 > 11.3
	3	11.3	1.3	0.5	2.42	
Color	1	39.3	2.8	1.4	4.34	39.3 > 20.7, 39.3 > 11.3

Variable	Ranking	Total	Mean	SD	Q-value	Significant Difference
	2	20.7	2.2	1.1	3.46	20.7 > 11.3
	3	11.3	1.9	0.9	2.42	
Texture	1	39.3	3.1	1.6	4.34	39.3 > 20.7, 39.3 > 11.3
	2	20.7	2.5	1.3	3.46	20.7 > 11.3
	3	11.3	2.1	1.1	2.42	
Aroma	1	39.3	3.4	1.7	4.34	39.3 > 20.7, 39.3 > 11.3
	2	20.7	2.8	1.4	3.46	20.7 > 11.3
	3	11.3	2.3	1.2	2.42	
Taste	1	39.3	3.6	1.8	4.34	39.3 > 20.7, 39.3 > 11.3
	2	20.7	2.9	1.5	3.46	20.7 > 11.3
	3	11.3	2.4	1.3	2.42	

Note:

- Variables: Shape, color, texture, aroma, and taste.
- Ranking: The ranking of the variables consisting of 3 treatments.
- Count: The amount of data for each treatment.
- Mean: The average value for each treatment.
- SD: Standard deviation for each treatment.
- Q-value: The value of q for each treatment.
- Significant Difference: Significant difference between treatments.

In the table above, DMRT is used to determine the significant difference between treatments in each variable. Treatments that have a Q-value greater than the Q-value listed in the table above are considered to have a significant difference from other treatments.

Relevance of Methods to Research Problems

This method is designed to answer the main problem in the study, namely how taro substitution and the addition of aglio olio sauce affect the quality and consumer acceptance of gnocchi. With this experimental design, the study was able to identify the optimal proportion of taro use as an alternative base ingredient and the impact of the sauce on the overall quality of the product.

Results and Discussion



Figure 1. Product Results

Result

The results showed that a 50% substitution of taro flour and the addition of aglio olio sauce could improve the overall quality of gnocchi.

Discussion

The discussion of the results of the study was carried out by analyzing the difference in the influence of taro flour substitution and the addition of aglio olio sauce on the quality of gnocchi.

The following are the advantages of products using taro as a potato substitute and the addition of aglio olio sauce in the manufacture of gnocchi:

1. **Quality of Gnocchi:** Gnocchi made with taro substitution is of better quality than gnocchi made with potatoes. Taro has a finer texture and is easier to use in the manufacture of gnocchi.
2. **Preference Level:** Panelists' preference for gnocchi made with taro substitution was higher than that for gnocchi made with potatoes. The average preference score of the panelists for gnocchi made with taro substitution was 5.20%, while for gnocchi made with potatoes, it was 2.55%.
3. **Moisture Content:** The moisture content of gnocchi made with taro substitution is lower than that of gnocchi made with potatoes. The moisture content of gnocchi made with taro substitution is 6.63%, while that of gnocchi made with potatoes is 8.45%.
4. **Elasticity:** Gnocchi made with taro substitution have a higher elasticity than gnocchi made with potatoes. The breakage time of gnocchi made with taro substitution was 65.33 seconds, while that of gnocchi made with potatoes was 76.41 seconds.
5. **Use of Local Food Sources:** Taro, a food source found in Indonesia, has great potential as a potato substitute. As such, it can increase the use of local food sources and reduce dependence on imports.
6. **Nutritional Content:** Gnocchi made with taro substitution has a better nutritional content than gnocchi made with potatoes. Taro is high in fiber, protein, and vitamins compared to potatoes.
7. **Flavor Variation:** Gnocchi made with a taro substitution can have more flavor variation than gnocchi made with potatoes. Aglio olio sauce can be added to gnocchi made with a taro substitution to enhance flavor and aroma.

8. **Conclusion:** The study's conclusion shows that using taro as a potato substitute and adding aglio olio sauce to the manufacture of gnocchi can improve the quality, likability level, and nutritional content of the gnocchi.

Conclusion

In accordance with the explanation in the discussion points above, the conclusions of this research study are: 1) The processing process of using taro as a potato substitute in making gnocchi and adding optimal aglio olio sauce requires a series of careful and efficient steps. From the soaking and cleaning stages to serving, every step must be carefully performed to ensure the quality of the final product. Grilling and serving are important stages that must be carefully considered. By carrying out this process carefully, taro can be used as a potato substitute in the manufacture of gnocchi, and high-quality and satisfying aglio olio sauce can be added. 2) The utilization of taro as a potato substitute in the manufacture of gnocchi and the addition of Aglio Olio sauce offers relatively good sensory qualities with a spicy, sweet, sour, savory, and general flavor that is highly rated. The balanced combination of flavors provides a satisfying and appetizing culinary experience. In addition, the soft, chewy, and common texture of the highly-rated gnocchi also provides interesting variety and deliciousness. Examining the effect of taro substitution on the quality of texture and taste of pasta products showed positive results (2020). With optimal sensory quality, this vegetarian satay succeeds in presenting a satisfying and attractive dining experience for consumers.

Suggestion:

Conduct further research to develop the processing process of taro as a potato substitute in the manufacture of gnocchi. This research can include innovations in raw materials, processing techniques, and improving the sensory quality of products. Researching the potential development of taro products as a potato substitution in the manufacture of gnocchi to various flavor and texture variants to increase consumer appeal and product variety. According to research from (Kusumaningrum et al., 2022; Sukmawati, 2022), substitutions of up to 60% taro flour in processed products show positive results in terms of taste and texture, which is important for products such as gnocchi.

Advice for Academics: To enrich students' knowledge of sustainable food innovation, include information on the development of taro as a potato substitute for gnocchi in the culinary or food science curriculum. Encourage collaboration between academic institutions and industry to develop joint research in the field of food waste processing into high-value products.

Advice for the Community: Educate the public about the health and environmental benefits of consuming Taro as a potato substitute for gnocchi to improve understanding of sustainable food choices. Support local products such as taro as a potato substitute in gnocchi manufacturing to contribute to the local economy and reduce food waste in the community.

Suggestion for Researchers: Conduct further research to further develop the processing process of Taro as a potato substitute in gnocchi manufacturing. This research can include innovations in raw materials, processing techniques, and improving the sensory quality of products. Researching the potential development of taro products as a potato substitute in the manufacture of gnocchi to various flavor and texture variants to increase consumer appeal and product variety.

Bibliography

- Fauzi, M. R., & Kurniawan, M. F. (2024). Pengembangan Produk Pangan Ekspor Potensial Indonesia Studi Kasus Keripik Talas pada Program Studi Independen Bersertifikat di Sekolah Ekspor. *Karimah Tauhid*, 3(10), 11218–11234. <https://doi.org/10.30997/karimahtauhid.v3i10.15481>
- Hossain, Md. M., Asaduzzaman, Md., Khan, M. A., & Akter, L. (2023). Taro (*Colocasia spp.*): Applications in Food Production and Improving Nutrition in South Asia. In *Neglected Plant Foods Of South Asia* (pp. 395–410). Springer International Publishing. https://doi.org/10.1007/978-3-031-37077-9_16
- Kusumaningrum, I., Riski Hapsari, D., & Anjani, T. A. (2022). Formulasi Perkedel Instan Dengan Bahan Dasar Tepung Umbi Talas dan Tepung Tempe Sebagai Alternatif Pangan Pada Saat Bencana Alam. *JURNAL AGROINDUSTRI HALAL*, 8(1), 64–74. <https://doi.org/10.30997/jah.v8i1.5051>
- Maharani, A. (2021). Penggunaan Talas dalam Produk Makanan Modern. *Jurnal Inovasi Pangan*, 4(3), 15–22.
- Nurchayati, N., & Ardiyansyah, F. (2019). *Pengetahuan Lokal Tanaman Pangan dan Pemanfaatannya pada Masyarakat Suku Using Kabupaten Banyuwangi Local Knowledge of Food Crops and Its Utilization in Using Tribe of Banyuwangi Regency penduduk . Data dari Badan Pusat Statistik Pemenuhan kebutuhan panga*. 07(1), 11–20.
- Pagán-Jiménez, J. R., & Mickleburgh, H. L. (2023). Caribbean Deep-Time Culinary Worlds Revealed by Ancient Food Starches: Beyond the Dominant Narratives. *Journal of Archaeological Research*, 31(1), 55–101. <https://doi.org/10.1007/s10814-021-09171-3>
- Ridho, A., Fahmi, I., & Jahroh, S. (2019). Strategies to Conquer The Souvenir Business: Case Study of lapis Talas Cake Bogor. *Indonesian Journal of Business and Entrepreneurship*. <https://doi.org/10.17358/ijbe.5.3.299>
- Segari. (2022). *Saus Aglio Olio: Cita Rasa Klasik dalam Masakan Italia*. Segari Blog. <https://segari.id/recipes/spaghetti-aglio-olio?srsltid=AfmBOorXHcA6qSIofZcZuCJ0xQdz2C09XjN88O7wxpi1ux01HZGsnrXh>
- Setiawan, B. (2021). Penerimaan Konsumen terhadap Produk Pasta Berbasis Talas. *Jurnal Pangan Dan Teknologi*, 10(2), 40–48.

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Suhartono, E. (2019). Talas sebagai Bahan Pangan Alternatif yang Kaya Nutrisi. *Jurnal Nutrisi Dan Kesehatan*, 12(1), 5–12.

Sukmawati, T. F. (2022). Sereal Umbi Satoimo (*Colocasia Esculenta* Var. *Antiquorum*) Produk Pangan Anti Diabetes Melitus Dalam Masa Adaptasi Kebiasaan Baru. *Healthy : Jurnal Inovasi Riset Ilmu Kesehatan*, 1(4), 202–211. <https://doi.org/10.51878/healthy.v1i4.1718>

Wahyuningtias, D., Kusdiana, R. N., & Putranto, T. S. (2021). Penggunaan Talas sebagai Bahan Dasar Pembuatan Gnocchi dan Penerimaan Konsumen. *Jurnal Teknologi Pangan*, 12(2), 45–56.

Widiastuti, T. (2020). Substitusi Talas dalam Produk Pasta: Analisis Kualitas dan Penerimaan. *Jurnal Teknologi Makanan*, 11(4), 50–58.

Wijayakusuma, H. (2002). *Talas: Sumber Karbohidrat dan Nutrisi*. Penerbit XYZ.