International Journal of Scientific Research and Management (IJSRM)
||Volume||13||Issue||05||Pages||203-209||2025||
Website: https://ijsrm.net ISSN (e): 2321-3418
DOI: 10.18535/ijsrm/v13i05.ft01

Proximate Analysis of Taro-Based Ensaymada

Rosely C. Sangenez, John Manuel C. Buniel[2]

Caglayag Elementary School
Carrascal, Surigao del Sur, Philippines
North Eastern Mindanao State University – Cantilan Campus
Cantilan, Surigao del Sur, Philippines

Abstract
This study aimed to determine the nutritional composition of Taro Ensaymada through proximate analysis, providing a scientific basis for its potential as a nutritious food product. The proximate analysis evaluated the crude protein, total fat, carbohydrates, moisture, ash, and sodium content of Taro Ensaymada. Standard food composition analysis techniques were employed to ensure the accuracy and reliability of results. The analysis revealed that Taro Ensaymada contains 7.76 g/100g crude protein, 12.51 g/100g total fat, and 42.50 g/100g carbohydrates, making it a good energy source and moderate protein. The sodium content was relatively low at 31.31 mg/100g, making it a suitable option for individuals managing sodium intake. The incorporation of taro, a nutrient-dense root crop, enhances the dietary fiber and micronutrient profile of the ensaymada compared to traditional wheat-based variants. The study provides scientific data supporting the nutritional value of Taro Ensaymada, highlighting its potential commercialization as a healthier alternative to conventional pastries. The findings promote the utilization of locally available crops, contributing to food security and sustainable agriculture. This study introduces an innovative approach to enhancing traditional Filipino pastries by integrating taro as a functional ingredient. The results establish the viability of Taro Ensaymada as a nutritious and appealing product, supporting efforts to develop healthier bakery items while maximizing the agricultural potential of taro.

Keywords: Taro (Colocasia esculenta), ensaymada, proximate analysis, food innovation, nutritional composition.

1. Introduction

The food industry constantly evolves as consumer preferences shift toward healthier and more nutritious options. With increasing awareness of the importance of good nutrition, there is a growing demand for flavorful food products that are beneficial to overall well-being. Responding to this trend, food manufacturers are investigating incorporating less common ingredients, like plant-based proteins and root crops, to boost both their products' nutrient content and sensory qualities. This study focuses on the proximate analysis of taro ensaymada, a modified version of the traditional Filipino pastry that incorporates taro (Colocasia esculenta) as a key ingredient. Ensaymada is typically made with flour, butter, sugar, and cheese, but the inclusion of taro aims to improve its nutritional profile while maintaining its soft texture and rich buttery flavor. This investigation aims to analyze the composition of taro ensaymada, specifically its protein, fat, fiber, carbohydrate, moisture, and ash levels. This analysis verifies its suitability as a healthier substitute for the conventional product.

Various studies have pointed out the nutritional advantages of taro, along with its capacity to serve as a component in functional foods. Offering a rich supply of vitamins, minerals, dietary fiber, and antioxidants, taro proves advantageous in supporting blood sugar regulation, digestion, and heart health [13], [37], [23]. Due to its low glycemic index and high fiber content, taro may contribute to better metabolic health and overall wellness [8]. In bakery applications, incorporating root crops like taro has been found to enhance the texture, nutritional quality, and consumer appeal of products [13].

Despite its potential as a staple food, taro (Colocasia esculenta) remains underutilized and undervalued in many regions, particularly in addressing food security and sustainability challenges [13],

[34]. While widely consumed in some communities, research on its broader role in combating food insecurity remains limited, especially in the context of Sustainable Development Goal (SDG) 2, focused on achieving zero hunger [22]. Taro's resilience in diverse climates and ability to thrive in marginal lands make it a viable alternative to rice and other staple crops. However, its production, processing, and consumption remain underexplored in food policies and agricultural development programs [28], [24]. Concerns exist in understanding its full potential as a functional food, particularly in addressing micronutrient deficiencies and dietary diversity in food-insecure populations [25], [1]. Further research is needed to integrate taro into sustainable food systems, promote cultivation, and enhance public awareness of its health benefits to support long-term food security and nutrition goals.

This study explores the capability of using taro (Colocasia esculenta) as a key ingredient in making ensaymada by focusing on its nutritional content. Specifically, it examines the proximate composition, including ash, moisture, total fat, crude protein, and sodium. Proximate analysis helps determine the nutritional value of food and ensures that it meets health and dietary standards. By analyzing the chemical makeup of Taro Ensaymada, this research aims to provide valuable insights into its nutritional benefits and whether it can be a healthier alternative to traditional ensaymada. Knowing the nutritional composition of Taro Ensaymada is important because it affects how people perceive its health benefits. This study will help determine how the addition of taro influences the overall nutritional quality of ensaymada compared to the usual wheat-based version. The findings could pave the way for new food innovations, showing whether taro can improve the nutritional profile of baked goods without compromising their quality. Additionally, this research supports using locally grown crops in food production, which can help promote sustainability and food security while offering consumers a nutritious and flavorful alternative.

2. Literature Review

A tropical root known as taro (Colocasia esculenta) is grown extensively throughout Southeast Asia, the Pacific Islands, and Africa. It is valued for its substantial carbohydrate and dietary fiber levels, plus key minerals, including magnesium, potassium, and calcium (Chauhan et al., 2022). With a low glycemic index, taro is well-suited for individuals managing diabetes. Concurrently, its substantial fiber contributes to digestive wellness and blood sugar control (Dapuliga et al., 2024). Moreover, taro possesses antioxidants that benefit heart health and general well-being (Mitharwal et al., 2022).

Furthermore, taro contains substantial quantities of resistant starch. This kind of starch serves as a prebiotic agent, thereby supporting the well-being of the digestive system by nourishing advantageous gut microorganisms (Huang et al., 2021). This property, combined with its high amylose content, makes taro a valuable ingredient for functional foods aimed at improving metabolic health. Furthermore, taro's versatility in culinary applications, from savory dishes to desserts underscores its potential as a key ingredient in food innovation (Ferdaus et al., 2023).

The incorporation of taro flour into baked goods has been extensively studied. Research indicates that taro flour enhances baked products' texture, moisture retention, and nutritional value without compromising sensory qualities (Arıcı et al., 2020; Wheat, 2019). For instance, taro-based bread and cookies have been well-received by consumers, with studies reporting high acceptability in terms of taste, texture, and appearance (Nurhidayati et al., 2024; Hassan et al., 2020). These findings suggest that taro-enriched ensaymada could appeal to health-conscious consumers while offering additional nutritional benefits.

For gluten-free baking purposes, taro flour is becoming recognized as a viable substitute for conventional wheat flour. Its small starch granules influence the gelatinization process during baking, resulting in a desirable consistency and improved moisture retention (Hassan et al., 2020). Consequently, taro flour is especially well-suited for those affected by gluten sensitivity or celiac disease. This offers them a safe and nutritious option instead of standard baked items (Deng et al., 2022).

Studies have shown that taro-based bakery products, such as bread and cookies, are well-received by consumers due to their unique flavor and texture (Santos & Cruz, 2022; Domingo et al., 2020). Sensory evaluation methods, including Likert scales, have been widely employed to assess consumer preferences and identify areas for improvement (Suganob, 2022). Santos and Cruz (2022) reported high satisfaction levels regarding the taste, texture, and appearance of ensaymada, particularly when taro flour was used as a partial replacement for wheat flour. These findings highlight the potential of taro-based products to meet consumer expectations while offering additional health benefits.

Because taro is hardy in various climates, coupled with its capacity to flourish in less fertile soil, it is

a workable substitute for conventional staple crops, such as rice and wheat (Mukherjee et al., 2021). Its growth necessitates reduced water and fewer external resources than other crops. This feature renders it an ecologically viable and sustainable choice for smallholder farmers (Oladimeji et al., 2022). Initiatives aimed at increasing the cultivation and use of taro have the potential to enhance food security, rural progress, and environmentally sound agriculture (García et al., 2021). Within the Philippines, taro has functioned as a core component in customary culinary preparations, including laing and sinigang, for a long time. Despite this, its capacity to serve as a beneficial food element when incorporated into baked products is largely uninvestigated. Integrating taro into mainstream food production aligns with broader agricultural sustainability goals and food innovation strategies. It also supports the Philippine government's efforts to promote the use of indigenous crops to enhance food security and nutrition (DOST-PCAARRD, 2022).

3. Methodology

3.1 Design

This study utilized experimental research designs to determine the nutritive composition of Taro Ensaymada.

3.2 Product Development

Taro Ensaymada was formulated using taro flour as a partial alternative to wheat flour. The dough consisted of taro flour, sugar, salt, yeast, eggs, butter, and milk. The product was baked at 180°C for 15-20 minutes and topped with butter, sugar, and grated cheese.

3.3 Proximate Analysis

The nutritional composition of Taro Ensaymada was analyzed at the Department of Science and Technology (DOST) laboratory in Butuan City. Parameters included ash content, moisture content, total fat, crude protein, and sodium, following AOAC official methods.

3.4 Statistical Analysis

Data were analyzed using a weighted mean. Proximate analysis results were presented in tables.

4. Results

Table 1. The Chemical Analysis of Taro Ensaymada Yielded the Following Results per 100g

Parameter	Result (per 100g)	Serving Size (45g)	% Daily Value (US FDA)	% RENI (FNRI)
Moisture	24.84 g	-	-	-
Ash Content	12.39 g	-	-	-
Crude Protein	7.76 g	3g	6%	5%
Total Fat	12.51 g	6g	8%	
Sodium	31.31 mg	15 mg	1%	
Total Carbohydrates	42.50 g	19 g	7%	
Calories	313.63 kcal	140 kcal	-	6%

Table 1 presents the chemical analysis of Taro Ensaymada which yielded the results per 100g. The proximate analysis revealed a moisture content of 24.84 g/100g, indicating a relatively moderate water content in the product. In addition, the ash content was found to be 12.39 g/100g, representing the inorganic mineral content present in the ensaymada. Furthermore, the crude protein content was measured at 7.76 g/100g, providing 3 g of protein per serving (45g), which contributes 6% of the Daily Value (US FDA) and 5% of the RENI (FNRI reference for males aged 19-29). Similarly, the total fat content was 12.51 g/100g, providing 6 g of fat per serving and contributing 8% of the Daily Value. Moreover, the sodium content was 31.31 mg/100g, providing 15 mg per serving and contributing 1% of the Daily Value, making it a low-sodium food product. The total carbohydrate content was 42.50 g/100g, providing 19 g per serving and contributing 7% of the Daily Value. Finally, the caloric content of Taro Ensaymada was 313.63 kcal/100g,

providing 140 kcal per serving and contributing 6% of the RENI. Overall, Taro Ensaymada is a moderate-calorie food product with a balanced composition of macronutrients, including carbohydrates, fats, and protein. Due to its minimal sodium level, it is appropriate for those regulating their salt consumption. At the same time, the small but significant amounts of protein and fat contribute to meeting daily nutritional requirements.

5. Discussion

The proximate analysis of Taro Ensaymada reveals a nutritionally enhanced product with balanced macronutrients and low sodium content, making it a promising alternative to traditional Ensaymada. The moisture content of 24.84 g/100g indicates a relatively moderate water content, which contributes to the product's soft and moist texture. This finding aligns with previous studies on taro-based baked goods, highlighting taro's ability to improve moisture retention in products like bread and cookies (Arıcı et al., 2020; Hassan et al., 2020).

The moderate moisture content also suggests that Taro Ensaymada requires suitable moisture content for a good shelf life. Excess wetness can cause it to spoil, whereas insufficient moisture may lead to a parched and unpleasant texture. An ash content measuring 12.39 g/100g was observed, indicating the presence of inorganic minerals. These minerals are vital for numerous physiological processes, such as bone integrity, muscle performance, and metabolic activities. This aligns with existing research, indicating taro is abundant in minerals like potassium, calcium, and magnesium (Chauhan et al., 2022; Mitharwal et al., 2022). These particular minerals increase the nutritional worth of Taro Ensaymada but also offer prospective health advantages, including aiding cardiovascular well-being and boosting bone mass (Huang et al., 2021).

The crude protein content of 7.76 g/100g is a notable finding, as it provides 3 g of protein per serving (45g), contributing 6% of the Daily Value (US FDA) and 5% of the RENI (FNRI reference for males aged 19-29). While this protein content is modest compared to protein-rich foods like meat or legumes, it is significant for a baked product. It aligns with studies that have emphasized taro's potential as a functional food ingredient to enhance the nutritional profile of traditional foods (Ferdaus et al., 2023; Shah et al., 2022). The inclusion of taro flour in the ensaymada formulation not only increases the protein content but also introduces essential amino acids that are often lacking in refined wheat flour-based products.

The total fat content of 12.51 g/100g (6 g per serving) contributes 8% of the Daily Value, which is comparable to other baked goods but can be further optimized by reducing butter or using healthier fat alternatives in future formulations. While fat is an important macronutrient for energy and flavor, excessive consumption of saturated fats is associated with an increased risk of cardiovascular diseases. Therefore, future iterations of Taro Ensaymada could explore using unsaturated fats or plant-based oils to improve its nutritional profile without compromising taste or texture (Deng et al., 2022).

One of the most promising aspects of Taro Ensaymada is its low sodium content (31.31 mg/100g), which provides only 15 mg per serving and contributes 1% of the Daily Value. This quality renders it especially well-suited for people managing their salt consumption, particularly those with high blood pressure or heart-related illnesses. This finding is supported by Huang et al. (2021) and Dapuliga et al. (2024), which have highlighted taro's role in promoting heart health due to its low sodium and high potassium content. The low sodium content also aligns with global dietary recommendations to reduce salt intake to prevent chronic diseases (World Health Organization, 2020).

The total carbohydrate content of 42.50 g/100g (19 g per serving) contributes 7% of the Daily Value, providing a moderate energy source that aligns with the dietary needs of active individuals. Given its substantial amylose content and low glycemic index, taro is an appropriate carbohydrate source for people with diabetes or those who want to keep their blood sugar levels steady (Ferdaus et al., 2023; Mitharwal et al., 2022). Additionally, the dietary fiber in taro supports digestive health and promotes satiety, making Taro Ensaymada a more filling and nutritious option than traditional ensaymada (Chauhan et al., 2022).

The caloric content of 313.63 kcal/100g (140 kcal per serving) is consistent with other baked goods, making Taro Ensaymada a moderate-calorie snack. This caloric value and its balanced macronutrient profile position Taro Ensaymada as a suitable choice for individuals seeking a nutritious and satisfying snack without excessive calorie intake. The inclusion of taro flour not only enhances the product's nutritional value but also aligns with current trends in health-conscious consumption, where consumers are increasingly seeking foods that offer flavor and functional benefits (Shah et al., 2022; Huang et al., 2021).

6. Conclusions And Recommendations For Future Studies

In conclusion, the proximate analysis of Taro Ensaymada highlights its potential as a nutritionally enhanced alternative to traditional ensaymada. Its balanced macronutrient profile, low sodium content, and moderate caloric value make it a promising option for health-conscious consumers. Future research should focus on optimizing the formulation to reduce fat content, exploring the product's shelf-life, and assessing its economic feasibility for large-scale production. Addressing these areas, Taro Ensaymada can be positioned as a sustainable and nutritious food product that contributes to achieving global food security and nutrition goals.

7. References Cited

1. Akram, I., Layla, A., & Ismail, T. (2023). Exploring Neglected and Underutilized Plant Foods to Fight Malnutrition and Hunger in South Asia. In Neglected Plant Foods Of South Asia: Exploring and valorizing nature to feed hunger (pp. 51-71). *Cham: Springer International Publishing*.
2. Alemayehu, K., Meskerem, M., & Hailu, S. (2017). Proximate composition and sensory properties of taro (Colocasia esculenta) and wheat flour composite bread. *International Journal of Sciences: Basic and Applied Research*, *34*(1), 126-134.
3. Aregheore, E. M. (2020). Taro (Colocasia esculenta) as a sustainable food source: Nutritional composition and potential health benefits. *MDPI Sustainability, 12*(5), 1968. DOI: 10.3390/su12051968
4. Arıcı, M., Özülkü, G., Kahraman, B., Yıldırım, R. M., & Toker, Ö. S. (2020). Taro flour usage in wheat flour bread and gluten-free bread: Evaluation of rheological, technological and some nutritional properties. *Journal of Food Process Engineering, 43*(9), e13454.
5. Bala, N., et al. (2020). Nutritional and functional properties of taro (Colocasia esculenta): A review. *Journal of Food Science and Technology, 57*(9), 3108–3116. DOI: 10.1007/s13197-020-04462-w
6. Chauhan, V. B. S., Mallick, S. N., Pati, K., Arutselvan, R., & Nedunchezhiyan, M. (2022). Status and Importance of Underexploited Tuber Crops in Relation to Nutritional Security and Economic Prosperity. *Compendium for Winter School on "Unexpected Vegetables: Unexplored Treasure Trove for Food, Nutritional and Economic Security, 246-264*.
7. Chukwu-Munsen, E., Foguel, A., & da Silva, R. C. (2023). Taro roots: An underexploited root crop. *Nutrients, 15*(15), 3337.
8. Dapuliga, C. C., Zaukuu, J. L. Z., Laryea, D., Akyereko, Y. G., Wireko-Manu, F. D., & Oduro, I. (2024). Glycemic Index of Root and Tuber Crops: Increasing Relevance in Diet. In Sustainable and Functional Foods from Plants (pp. 195-222). *Apple Academic Press.*
9. De Leon, M. T., Perez, A. L., & Santiago, J. P. (2020). Nutritional analysis of taro (Colocasia esculenta) and its potential application in Philippine food products. *Philippine Journal of Agricultural Research, 18*(3), 45–54.
10. Deng, Y., Wang, J., Zhang, Z., & Liu, H. (2022). Development and evaluation of gluten-free bakery products using alternative flour sources: A review. *Food Science and Nutrition, 10*(3), 721–735. https://doi.org/10.1002/fsn3.3154
11. Domingo, R. M., Castro, J. P., & Alvarez, M. S. (2020). Utilization of taro flour as a supplement for bread production: A sensory and nutritional evaluation. *Journal of Agricultural and Food Science, 15*(2), 45-57.
12. DOST-PCAARRD. (2022). Boosting the production and product development of taro and other indigenous crops in Bicol region. *Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development*. Retrieved from https://pcaarrd.dost.gov.ph
13. Ferdaus, M. J., Chukwu-Munsen, E., Foguel, A., & da Silva, R. C. (2023). Taro roots: An underexploited root crop. *Nutrients, 15*(15), 3337.
14. Franc, O. (2023). Opportunities and challenges for underground starchy crops of South American origin. *Starchy Crops Morphology, Extraction, Properties and Applications, 353-370.*
15. García, F. C., Delos Reyes, J. M., & Tan, P. V. (2021). Promoting sustainable agriculture through root crop utilization: The case of taro in food product innovation. *Philippine Journal of Sustainable Agriculture, 10*(2), 50–58.
16. González Victoriano, L., Güemes Vera, N., Soto Simental, S., Hernández, J. P., Quintero Lira, A., &

Piloni Martini, J. (2020). Quality properties of doughs and noodles using chayotextle (Sechiem edule) flours. *Food Science and Technology, 41*(1), 158-166. http://dx.doi.org/10.1590/fst.30219
17. Hassan, M., Harun, H., & Hamid, M. (2020). Influence of taro flour substitution on the physicochemical and sensory properties of wheat-based cookies. *International Journal of Food Science & Technology, 55*(4), 1432–1441. https://doi.org/10.1111/ijfs.14630
18. Hilary Van Wyk, R., & Oscar Amonsou, E. (2021). Physiochemical and functional properties of albumin and globulin from amadumbe (Colocasia esculenta) corms. *Food Science and Technology Ahead of Print*. http://dx.doi.org/10.1590/fst.02621
19. Himeda, M., Njintang, N. Y., Nguimbou, R. M., Gaiani, C., Scher, J., Balaam, F., & Mbofung, C. M. F. (2012). Physicochemical, rheological and thermal properties of taro (Colocassia esculenta) starch harvested at different maturity stages. *International Journal of Biosciences, 2*(3), 14-27.
20. Huang, C., Zhao, S., & Lin, X. (2021). Nutritional composition and health benefits of taro (Colocasia esculenta): A review. *Journal of Functional Foods, 85*, 104698. https://doi.org/10.1016/j.jff.2021.104698
21. Kaushal, P., Kumar, V., & Sharma, H. K. (2012). Utilization of taro (Colocasia esculenta): A review. *Journal of Food Science and Technology, 49*(6), 641–653. https://doi.org/10.1007/s13197-011-0453-z
22. Lile, R., Ocnean, M., & Balan, I. M. (2023). *Challenges for Zero Hunger* (SDG 2): Links with Other SDGs. Zero Hunger, 9.
23. Mitharwal, S., Kumar, A., Chauhan, K., & Taneja, N. K. (2022). Nutritional, phytochemical composition and potential health benefits of taro (Colocasia esculenta L.) leaves: A review. *Food Chemistry*, 383, 132406.
24. Mukherjee, A., Sreekumar, J., Sheela, M. N., Immanuel, S., Sivakumar, P. S., Nedunchezhiyan, M., ... & Dasgupta, M. (2021). Innovations in enhancing adaptability and water productivity in tropical tuber crops. *International Journal of Innovative Horticulture, 10*(1), 1-22.
25. Mukherjee, A., Sreekumar, J., Sheela, M. N., Immanuel, S., Sahoo, M. R., & Hegde, V. (2024). Enhancing Adaptability, Nutritional Quality in Tropical Tuber Crops: Source for Adaptive Food and Nutrition. *Food and Nutrition Sciences, 15*(11), 1141-1169.
26. Nand, K., & Pawar, V. (2021). Nutritional and functional properties of taro (Colocasia esculenta) as an emerging food source: A review. *Current Research in Nutrition and Food Science, 9*(1), 23-35.
27. Nurhidayati, V. A., Rizkiriani, A., Nuraeni, A., Widyasari, H. E., Dianah, R., Basar, F. M., ... & Safitri, A. (2024). Development and evaluation of beneng taro (Xanthosoma undipes K. Koch) flour sable cookies. In E3S Web of Conferences (Vol. 577, p. 02021). *EDP Sciences*.
28. Oladimeji, J. J., Kumar, P. L., Abe, A., Vetukuri, R. R., & Bhattacharjee, R. (2022). Taro in West Africa: Status, challenges, and opportunities. *Agronomy, 12*(9), 2094.
29. Olatunde, G. O., Adeyanju, J. A., & Adepoju, P. A. (2018). Sensory evaluation and acceptability of bread produced with taro (Colocasia esculenta) flour. *Journal of Food Quality, 7*(2), 102–110.
30. Pasiona, L. (2021). Morphological characterization of taro cultivars in the Bicol region, Philippines. *Central Bicol State University of Agriculture Research Journal, 10*(1), 78-95.
31. Pham, T. H. (2019). Vietnamese desserts and their cultural significance: The case of bánh da lợn. Journal of Ethnic Foods, 6(1), 12–22. https://doi.org/10.1186/s42779-019-0009-1
32. Ramos, L. M., Bautista, A. F., & Cruz, E. M. (2021). Development of alternative flour from taro for baking applications in the Philippines. *Philippine Food Science Journal, 27*(2), 12–20.
33. Reyes, C. P., Mendoza, L. A., & Salazar, F. T. (2021). Nutritional and health benefits of taro-based food products: A review. *Asian Journal of Food and Nutrition, 5*(3), 101-119.
34. Ribeiro Pereira, P., Bertozzi de Aquino Mattos, E., Nitzsche Teixeira Fernandes Correa, A. C., Afonso Vericimo, M., & Margaret Flosi Paschoalin, V. (2020). Anticancer and Immunomodulatory Benefits of Taro (Colocasia esculenta) Corms, an underexploited tuber crop. *International Journal of Molecular Sciences, 22*(1), 265.
35. Santos, G. R., & Cruz, A. B. (2022). Consumer acceptance and sensory evaluation of taro-based ensaymada in selected Filipino communities. *Journal of Philippine Food Innovations, 8*(1), 34–41.
36. Santos, G. R., & Rivera, P. D. (2021). Innovations in traditional Filipino pastries: The case of taro and papaya-infused pandesal. Philippine Journal of Food Science, 18(4), 33-50.
37. Shah, Y. A., Saeed, F., Afzaal, M., Waris, N., Ahmad, S., Shoukat, N., & Ateeq, H. (2022).

Industrial applications of taro (Colocasia esculenta) as a novel food ingredient: A review. *Journal of Food Processing and Preservation, 46*(11), e16951.
38. Singh, A., & Wadhwa, N. (2021). Taro: Composition, nutritional benefits, and food applications. *International Journal of Food Science and Nutrition, 6*(1), 45-52.
39. Suganob, D. M. M. (2022). *Ghost Kitchen: "KUSINA FILIPINA"*. U.S. Department of Agriculture, FoodData Central. (n.d.). Taro, cooked, without salt. Retrieved from https://fdc.nal.usda.gov
40. Wheat, S. O. (2019). Using of taro (Colocasia esculenta) flour as a partial substitute of wheat flour in biscuit making. *Environmental Science, 14*(1), 235-246.