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Sensory acceptability of Taro (Colocasia esculenta) and Ube (Dioscorea alata) Masi: A Filipino delicacy formulation

Cesario Y. Ponce Jr.
Cebu Technological University - Main Campus
R. Palma St., Cebu City, Philippines
Email: Cesario.poncejr@deped.gov.ph

ABSTRACT

Amid ongoing efforts to innovate traditional Filipino delicacies using indigenous root crops, this study explores the integration of taro and ube as alternative formulations for Masi. This study determined the sensory acceptability of an innovative variation of the traditional Filipino delicacy, Masi, by incorporating taro and ube in different formulations. Specifically, the study evaluated using three formulations: F1 (750 g taro + 250 g ube), F2 (750 g taro + 500 g ube), and F3 (750 g taro + 750 g ube), in terms of taste, texture, aroma, color, and general acceptability. An experimental method was employed using sensory evaluation with one hundred panelists composed of masi makers, teachers, parents, and Grade 6 learners at Yati Elementary School, Liloan, Cebu. Data were gathered through a 9-point hedonic scale and analyzed using weighted mean and analysis of variance (ANOVA). Findings revealed that among the three formulations, F3 (equal proportion of taro and ube) consistently obtained the highest ratings across all sensory attributes, categorized as "like very much" in taste, color, aroma, texture, and overall acceptability. F2 was rated as "like moderately," while F1 received the lowest but still acceptable evaluation. Statistical analysis confirmed significant differences among the formulations, favoring higher ube content for improved sensory quality. The study concluded that Taro-Ube Masi is highly acceptable and has strong potential as a nutritious, marketable product that promotes indigenous crops. As an output, a Techno-Guide was developed to provide standardized preparation, packaging, and marketing procedures for beneficiaries such as students, homemakers, entrepreneurs, and local communities to support nutrition, cultural preservation, and livelihood opportunities.

Keywords: Vocational education, Taro, Ube, Masi, acceptability, sensory evaluation, techno-guide, Liloan, Cebu, Philippines

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INTRODUCTION

The importance of Philippine native products, such as taro (Colocasia esculenta) and ube (Dioscorea alata), lies in their potential to promote sustainable agriculture and enhance food security. These crops are deeply embedded in Filipino culture, serving as vital ingredients for traditional delicacies and embodying the rich agricultural heritage of the country.

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Government initiatives have emphasized the role of indigenous crops in uplifting rural livelihoods, supporting biodiversity, and achieving inclusive economic growth. Notably, research underscores the ecological and economic benefits of integrating native crops into mainstream agricultural practices, highlighting their adaptability to local conditions and their ability to provide nutritional and livelihood benefits (DOST-PCAARRD, 2022).

The drive towards promoting native products also addresses growing global challenges, such as climate change and food insecurity. Native crops like taro and ube are valued for their resilience and low-input requirements, making them suitable for smallholder and sustainable farming systems. Studies conducted emphasize that these crops can offer valuable opportunities for diversification, rural development, and environmental stewardship (García et al., 2021; Oladimeji et al., 2022). As the Philippines continues its efforts to strengthen indigenous product industries, these native crops serve as a model for aligning cultural significance with sustainable innovation strategies.

Taro (Colocasia esculenta) is recognized as a highly nutritious root crop with multiple health benefits supported by recent scientific studies. It contains essential macronutrients like carbohydrates and proteins, as well as significant micronutrients including vitamins C and B complexes, beta-carotene, iron, and folic acid, which contribute to improved nutrition and prevention of anemia (Li et al., 2023). In addition to its nutritional value, taro exhibits numerous bioactive compounds such as resistant starch, anthocyanins, flavonoids, and lectins, which have demonstrated antioxidant, anti-inflammatory, anticancer, and antidiabetic properties (Corrêa et al., 2023). These compounds help inhibit the proliferation of cancer cells, reduce inflammation, and regulate blood sugar levels, making taro both a functional food and a potential therapeutic agent (Agyare et al., 2023; Corrêa et al., 2023). The versatility and health-promoting qualities of taro underscore its importance as a beneficial dietary component and a promising subject for further food product development and health research.

Ube, or purple yam (Dioscorea alata), is a nutrient-rich root crop that offers numerous health benefits as documented in recent studies. It is an excellent source of carbohydrates, dietary fiber, potassium, vitamin C, and antioxidants such as anthocyanins, which contribute to its vibrant color and provide protective effects against oxidative stress and inflammation (McCabe, 2023; Anwar et al., 2021). These bioactive compounds have been linked to the management of blood sugar levels, making ube particularly beneficial for individuals with type 2 diabetes by reducing insulin resistance and slowing glucose absorption (McCabe, 2023). Furthermore, ube is associated with cardiovascular benefits due to its potential to lower blood pressure and improve blood circulation, as well as anti-inflammatory effects that may alleviate symptoms of asthma (McCabe, 2023). Additionally, ube supports gut health through its resistant starch content, which promotes beneficial gut microbiota growth. Overall, these properties highlight ube as a functional food with promising applications in nutrition and health enhancement.

Internationally, research on taro and ube reveals significant gaps in breeding, characterization, and global germplasm databases. While taro is recognized for its nutritional and medicinal value in various tropical regions, there remains a lack of systematic comparison of genetic diversity across continents. Collaborative breeding and standardized procedures for germplasm exchange—critical to improving disease resistance and yield—are yet to be fully established (Oladimeji et al., 2022). Additionally, ube's global potential as a functional food remains underexplored, with most research focusing on staple production rather than value-added applications or consumer acceptability for processed foods (Lebot & Dulloo, 2021).

Despite the increasing awareness of underutilized crops' contribution to food security and nutrition, international studies still tend to overlook cultural and sensory aspects that influence local acceptability, particularly for innovative food products derived from taro and ube. The development of evaluation frameworks for acceptability, nutritional benefits, and

market feasibility is fragmented, with few cross-cultural or market-based comparative studies (Mukherjee et al., 2021; García et al., 2021).

In the Philippines, while taro and ube are staple ingredients in many households and celebrated in local cuisine, empirical studies focusing on sensory evaluation, consumer acceptance, and market expansion of new products (such as Masi incorporating taro and ube) remain limited. The Philippine literature from largely centers on production statistics and agronomic challenges, with insufficient focus on product development, value addition, and dietary diversity (DOST-PCAARRD, 2022). Moreover, research addressing post-harvest technology, innovation in food processing, and integration into school feeding programs has not kept pace with other agricultural modernization efforts.

There is a lack of comprehensive studies that evaluate how socio-cultural perceptions, nutritional knowledge, and consumer preferences impact the mainstreaming of innovative food products that use taro and ube. Existing research tends to focus on feasibility and production rather than the social dynamics of food acceptance in diverse Filipino communities (Jyothy et al., 2017). This highlights a gap for studies that bridge agricultural science, food technology, and social research, providing insights relevant to schools, local markets, and national food security strategies.

Locally, in communities such as Yati Elementary School in Cebu, there is scarce research or documentation on the acceptability and potential benefits of incorporating native products like taro-ube Masi into the diet of school children. Preliminary school-based studies in the region focus primarily on commonly available snacks and imported dietary items, missing opportunities to contextualize indigenous products' role in nutrition and cultural education. No locally published studies have systematically assessed sensory attributes, willingness to buy, or health impacts of taro-ube food innovations in school settings.

Further, the lack of participatory research involving teachers, students, and parents leaves a void in understanding real-world applications of indigenous ingredients for school-based feeding or nutrition programs. There is also a need to assess whether such innovations can foster cultural pride, boost local economies, and promote sustainable food systems, which are important outcomes for rural schools such as Yati Elementary in Cebu.

Given these gaps, this study is essential to provide evidence-based recommendations for integrating native crops like taro and ube into innovative food products for local consumption. It aims to bridge agricultural, nutritional, and cultural dimensions by evaluating acceptability and potential benefits of taro-ube Masi in a school context. Such research can inform policy, enrich curriculum, and contribute to food security by leveraging culturally significant and sustainable crops thereby addressing local and national priorities for health, heritage, and economic upliftment.

Statement of the problem

This research developed masi that utilized taro (Colocasia esculenta) and ube (Dioscorea alata) at Yati Elementary School, Yati, Liloan, Cebu during the academic year 2022 to 2023 as basis for a techno guide. Specifically, this study sought to answer the following questions.

1. What formulation of taro ube masi can be prepared using the following combinations: F1 consisting of 750 g mashed taro, 250 g mashed ube, 1 teaspoon muscovado sugar, 1 teaspoon ground peanut, and 1 cup coconut milk; F2 consisting of 750 g mashed taro, 500 g mashed ube, 1 teaspoon muscovado sugar, 1 teaspoon ground peanut, and 1 cup coconut milk; and F3 consisting of 750 g mashed taro, 750 g mashed ube, 1 teaspoon muscovado sugar, 1 teaspoon ground peanut, and 1 cup coconut milk?

2. As perceived by the respondents, which formulation is the most acceptable in terms of taste, texture, aroma, color, and general acceptability?
3. Is there a significant mean difference in general acceptability among the three masi formulations?
4. Based on the findings of the study, what techno guide can be developed?

METHODOLOGY

This study employed an experimental research design to evaluate the sensory acceptability of taro (Colocasia esculenta) and ube (Dioscorea alata) masi. Three formulations containing varying proportions of taro and ube were developed while all other ingredients were kept constant to ensure a controlled comparison. Standard procedures in preparing traditional masi were followed for all formulations. Sensory evaluation was conducted using a 9-point hedonic scale to assess taste, texture, aroma, color, and general acceptability. One hundred panelists participated in the evaluation. Product optimization was carried out through systematic adjustments in ingredient proportions with careful documentation of quantities and preparation procedures. Each formulation underwent three replications. The gathered data were tabulated and analyzed using weighted mean and analysis of variance (ANOVA) to determine significant differences among the formulations.

The study followed an Input Process Output framework. The input consisted of the three formulations of taro and ube masi. Formulation 1 contained 750 grams taro and 250 grams ube with 1 tsp macovado sugar, 1 tsp ground peanut, and 1 cup coconut milk. Formulation 2 consisted of 750 grams taro and 500 grams ube with 1 tsp macovado sugar, 1 tsp ground peanut, and 1 cup coconut milk. Formulation 3 contained 750 grams taro and 750 grams ube with 1 tsp macovado sugar, 1 tsp ground peanut, and 1 cup coconut milk. These formulations were subjected to sensory evaluation using the 9-point hedonic scale in assessing taste, texture, aroma, color, and general acceptability. The acceptability of the product based on these attributes served as the basis for determining the most acceptable formulation. The output of the study was the development of a techno guide derived from the most acceptable formulation as rated by the consumer and trained panelists. The process followed an experimental procedure that began with requesting permission from the school administrator to conduct the study, gathering the subjects for testing, conducting pre testing of the treatments, testing the different treatments, applying statistical treatment of data, analyzing and interpreting the results, and finally presenting the conclusions and recommendations. The recipe formulations were subjected to sensory evaluation to determine the acceptability level of the product.

The study was conducted at Yati Elementary School in Yati, Liloan, Cebu Division of Cebu Province. Yati Elementary School was established in 1949 and is located in the mainland of Barangay Yati in the municipality of Liloan. It is one of the largest barrio schools in the municipality and offers classes from kindergarten to Grade Six. The school has a population of 2539 learners. There are 7 sections for kindergarten, 12 sections for Grade One, 11 sections for Grade Two, and 10 sections for Grades Three to Six. The institution currently has 73 members of faculty and staff including the School Head and Administrative Assistant. The school is classified as a big school and aims to support the holistic formation of 21st century learners while adhering to the DepEd mission, vision, and goals. The researcher personally conducted the experiment at Yati Elementary School in Yati, Liloan, Cebu.

The respondents of the study consisted of 100 panel tasters composed of 30 trained panelists and 70 consumer panelists. The trained panelists included 20 masi makers and 10 teachers. The consumer panelists consisted of 35 Grade Six learners and 35 parents or consumers. The distribution of respondents showed that masi makers represented f 20 or 20%, teachers represented f 10 or 10%, Grade Six learners represented f 35 or 35%, and parents

represented f 35 or 35%, with a total of 100 respondents corresponding to 100%. These respondents served as the evaluators in the sensory assessment of the acceptability of taro (Colocasia esculenta) and ube or yam (Dioscorea alata) masi.

The primary research instrument used in the study was the 9-point hedonic scale adapted from established sensory evaluation methodologies commonly used in food science research. A key reference for the instrument was Sensory Evaluation Practices (3rd ed.) by Stone, H., and Sidel, J. L. (2004), ensuring that the tool was scientifically grounded and appropriate for assessing food acceptability. A sensory evaluation sheet was used to gather the data and the samples were subjected to sensory evaluation by the panelists. Each of the three formulations included a corresponding qualitative description to guide evaluation. Before the sensory sampling was conducted, the researcher provided an orientation to the panelists to ensure that they clearly understood the evaluation process and criteria. This procedure was necessary to obtain reliable and consistent responses. The instrument aimed to determine which treatment formulation of the product was considered the most acceptable.

Data gathering was conducted through a series of systematic procedures. A request letter seeking permission to conduct the study was first prepared by the researcher and submitted to the principal of Yati Elementary School. After receiving approval, the researcher prepared all necessary samples for the study. The researcher then prepared the different recipe treatments. After preparation, the samples were tasted and questionnaires were distributed to the panelists to determine which treatment they preferred most. The one hundred panelists tasted the different recipe formulations three times. Each formulation contained the same ingredients but differed in proportion or ratio of measurement. The panelists rated the sensory attributes of the different preparations using a prepared score card and their ratings were recorded accordingly. They examined the sensory properties of the samples using the hedonic scale. Perceptions of taste, texture, aroma, color, and acceptability were rated and documented. The data were then tabulated and the necessary computations were performed to present the results. Descriptive analysis for each attribute was also evaluated using the same score sheet with five weighted points per sensory characteristic description. The score sheet was designed to facilitate this evaluation process. A glass of water was provided to the panelists to rinse their mouths between sample testing. Pangborn (1967) as cited by Giango (2004) identified scoring and scaling as one of the most frequently used sensory evaluation methods due to its diversity, simplicity, and suitability for statistical analysis. This approach involved using a scale or score corresponding to certain descriptions or reactions to product attributes and required the development of vocabulary that described varying intensities of sensory stimuli or reactions to the product in graduated degrees of negativity or positivity. At the conclusion of the research, the proposed output was developed based on the findings and the thorough investigation conducted.

The product preparation involved three experimental groups labeled Formulation 1 (F1), Formulation 2 (F2), and Formulation 3 (F3). Formulation 1 consisted of 250 grams mashed ube, 750 grams taro, 1 teaspoon muscovados sugar, 1 teaspoon peanuts, and 1 teaspoon coconut milk. Formulation 2 consisted of 500 grams mashed ube, 750 grams taro, 1 teaspoon muscovados sugar, 1 teaspoon peanuts, and 1 teaspoon coconut milk. Formulation 3 consisted of 750 grams mashed ube, 750 grams taro, 1 teaspoon muscovados sugar, 1 teaspoon peanuts, and 1 teaspoon coconut milk. The standard recipe of masi used in the preparation required 3 ¼ cups (400 grams) glutinous and non-glutinous rice flour that was sifted, 1 cup coconut milk, and 7 oz boiling water. The filling required 1 cup roasted nuts that were grounded and 1 cup brown sugar. In preparing the product, the ground roasted peanuts and brown sugar or muscovado was mixed and set aside. The mixed glutinous and non-glutinous rice flour was placed in a large bowl, a hole was made in the center, water was added, and mixing began to form a dough. Water was added gradually until a smooth dough with a satiny texture was

achieved. The dough was scooped and shaped into a ball then flattened into a disk by hand. Each rice ball was dropped into a pot of boiling water over medium heat and cooked until it floated which took about 25 minutes. The cooked dough was removed using a slotted spoon, excess water was drained, and the product was allowed to cool for several minutes. The dough was kneaded while gradually adding coconut milk until it softened. The dough was flattened again and 1 teaspoon of muscovado filling was placed inside before forming pleats and sealing the dough.

Various tools were utilized in the preparation of masi. These included an electric weighing scale used to weigh ingredients, a measuring glass used to measure liquid ingredients, mixing bowls used for mixing dry and liquid ingredients, measuring cups used for measuring dry ingredients, and a mortar and pestle used to crush and grind ingredients into a fine paste. The ingredients used in the formulation of taro (Colocasia esculenta) and ube included muscovado sugar, ground peanuts, taro, ube, and coconut milk. For F1 the quantities were 100g sugar, 100g ground peanuts, 750 g taro, 250 g ube, and 300g coconut milk. For F2 the quantities were 100g sugar, 100g ground peanuts, 750 g taro, 500 g ube, and 300g coconut milk. For F3 the quantities were 100g sugar, 100g ground peanuts, 750 g taro, 750 g ube, and 300g coconut milk.

The preparation procedure involved obtaining the raw materials from the market or directly from crop owners. The gabi and ube were boiled for about 30 minutes or until tender and then mashed or pounded. The ingredients for the different formulations were carefully weighed or measured. After mashing and pounding the gabi and ube, the solid ingredients such as sugar, peanuts, and coconut milk were measured according to the required quantities. The mashed gabi and ube were kneaded to form a dough while coconut milk was gradually added until the desired texture was reached. Small balls were formed from the dough. Each ball was flattened and a tablespoon of mixed muscovado sugar and peanuts was placed at the center. The sides were pleated and sealed. The product was then wrapped with banana leaves to enhance flavor.

The statistical analysis of the study involved several measures. Frequency and percentage were used to present the distribution of responses of the identified panelists. The Average Weighted Mean was used to determine the average perceptions of the panelists regarding the sensory characteristics of the recipe treatments in terms of the acceptability of taro (Colocasia esculenta) and ube (Dioscorea alata) masi. Mean and Standard Deviation were used to evaluate the five sensory attributes namely texture, taste, color, flavor, and general acceptability. Analysis of variance (ANOVA) was also applied to determine whether significant differences existed among the three formulations.

The scoring and scaling procedures for the descriptive test were applied to facilitate the interpretation of the data regarding the acceptability of taro (Colocasia esculenta) and ube (Dioscorea alata) masi. The mean results were interpreted using the Nominal Scale. The trained panelists classified the three formulations using a range of one (1) to five (5). Previous studies indicated that respondents may have different descriptions and interpretations of masi, thus a standardized scale was used. A mean scale of 4.20 to 5.00 corresponded to the description Highly Palatable for taste, Denser Chewy for texture, Extremely Pleasant for aroma, Slightly Violet for color, and Extremely Acceptable for general acceptability. A mean scale of 3.40 to 4.19 corresponded to Very Palatable for taste, Slightly Chewy for texture, Very Pleasant for aroma, Moderately Violet for color, and Very Acceptable for general acceptability. A mean scale of 2.60 to 3.39 corresponded to Moderately Palatable for taste, Slightly Dry for texture, Pleasant for aroma, Dark Violet for color, and Moderately Acceptable for general acceptability. A mean scale of 1.80 to 2.59 corresponded to Palatable for taste, Moderately Dry for texture, Less Pleasant for aroma, Darker Violet for color, and Slightly Acceptable for general acceptability. A mean scale of 1.00 to 1.79 corresponded to Not Palatable for taste, Very Dry

for texture, Not Pleasant for aroma, Very Dark Violet for color, and Not Acceptable for general acceptability. The rating of each attribute depended on the perception of the panelists.

To determine the level of acceptability among the consumer type of panelists, a nine (9) point hedonic scale was used. The hedonic scale ranged from 1 dislike extremely to 9 like extremely. The interpretation of the scale followed specific mean ranges. A mean range of 8.12 to 9.00 corresponded to Like Extremely (LE) which represented the highest degree of acceptance. A mean range of 7.23 to 8.11 corresponded to Like Very Much (LVM) which represented a higher degree of acceptance. A mean range of 6.34 to 7.22 corresponded to Like Moderately (LM) which represented a high degree of acceptance. A mean range of 5.45 to 6.33 corresponded to Like Slightly (LS) which represented a lower degree of acceptance. A mean range of 4.56 to 5.44 corresponded to Neither Like/Dislike (NLOD) which represented the neutral ground of acceptance or rejection. A mean range of 3.67 to 4.55 corresponded to Dislike Slightly (DS) which represented the least degree of rejection. A mean range of 2.78 to 3.66 corresponded to Dislike Moderately (DM) which represented a lower degree of rejection. A mean range of 1.89 to 2.77 corresponded to Dislike Very Much (DVM) which represented a high degree of rejection. A mean range of 1.00 to 1.88 corresponded to Dislike Extremely (DE) which represented the highest degree of rejection.

The hedonic rating scale test was used to determine the degree of liking and disliking of the panelists. The highest scale of 9 corresponded to Like Extremely which indicated the highest degree of satisfaction in terms of the characteristics of the qualities being studied, while 1 corresponded to Dislike Extremely which indicated the highest degree of dissatisfaction. The intermediate categories included Like Very Much with a mean range of 7.23 to 8.11 representing a higher degree of satisfaction of product quality in terms of sensory attributes, Like Moderately with a mean range of 6.34 to 7.22 representing a high degree of satisfaction of sensory quality, Like Slightly with a mean range of 5.45 to 6.33 representing a low degree of satisfaction, Neither Like or Dislike with a mean range of 4.56 to 5.44 representing the neutral ground of acceptance between satisfaction and dissatisfaction, Dislike Slightly with a mean range of 3.67 to 4.55 representing the least degree of dissatisfaction, Dislike Moderately with a mean range of 2.78 to 3.66 representing a lower degree of dissatisfaction, and Dislike Very Much with a mean range of 1.89 to 2.77 representing a higher degree of dissatisfaction. The attributes evaluated in the sensory assessment included taste, texture, aroma, color, and general acceptability. These interpretations guided the analysis of panelists' responses regarding the sensory qualities of the product.

RESULTS AND DISCUSSION

This section presents the analysis and interpretation of the sensory evaluation data gathered from 100 participants who assessed masi formulations made with taro (Colocasia esculenta) and ube (Dioscorea alata) at Yati Elementary School in Yati, Liloan, Cebu during the academic year 2022 to 2023. The study employed an experimental research design in which three product formulations were prepared using different proportions of taro and ube while maintaining constant amounts of muscovado sugar, ground peanut, and coconut milk. The respondents consisted of trained and consumer panelists who evaluated the products using a 9-point hedonic scale. Data were analyzed using frequency, percentage, weighted mean, standard deviation, and analysis of variance to determine patterns of preference and possible significant differences among formulations. The discussion that follows is grounded entirely in the collected sensory data and interprets the findings in direct relation to the objectives of the study, which aimed to determine the most acceptable masi formulation and to examine whether significant differences existed among them.

Three formulations were developed to determine how variations in the ratio of taro and ube influence the sensory attributes of masi. Formulation F1 contained 750-gram taro and 250-gram ube with 1 tsp muscovado sugar, 1 tsp ground peanut, and 1 cup coconut milk. Formulation F2 consisted of 750-gram taro and 500-gram ube with 1 tsp muscovado sugar, 1 tsp ground peanut, and 1 cup coconut milk. Formulation F3 contained 750-gram taro and 750-gram ube with 1 tsp muscovado sugar, 1 tsp ground peanut, and 1 cup coconut milk. All formulations followed the same preparation process in which taro and ube were cleaned, peeled, boiled until soft, mashed separately, and combined according to the specified ratios. Muscovado sugar and ground peanuts were incorporated to enhance flavor and texture while coconut milk was added to provide creaminess and moisture. The deliberate variation in tuber ratio allowed the researchers to observe how ingredient balance affects taste, aroma, texture, color, and overall preference among evaluators.

The evaluation of taste revealed a clear trend favoring formulations with higher ube content. Each formulation received 100 total responses. Formulation F1 obtained 654 total weighted points with a weighted mean of 6.54 and SD of 17.06 which corresponded to the categorical response Like Slightly. Formulation F2 received 722 total weighted points with a weighted mean of 7.22 and SD of 16.77 categorized as Like Moderately. Formulation F3 recorded the highest score with 809 total weighted points, a weighted mean of 8.09, and SD of 16.98 which corresponded to Like Very Much. The progression of scores from 6.54 to 7.22 to 8.09 indicates that increasing the proportion of ube enhanced the flavor appeal of the product. This outcome is consistent with the known sensory characteristics of ube which contributes sweetness and a distinctive flavor that often increases consumer liking. Studies such as Rivera et al. (2021) and Tabula et al. (2020) have likewise shown that ube enriched traditional foods receive higher taste ratings because of their appealing sweetness and familiarity among Filipino consumers.

Texture evaluation also demonstrated increasing acceptability as the amount of ube increased. Formulation F1 produced 649 total weighted points with a weighted mean of 6.49 and SD of 18.32 corresponding to Like Slightly. Formulation F2 obtained 727 total weighted points with a weighted mean of 7.27 and SD of 17.74 categorized as Like Moderately. Formulation F3 achieved the highest rating with 780 total weighted points, a weighted mean of 7.8, and SD of 14.18 also interpreted as Like Moderately. Although both F2 and F3 were rated Like Moderately, the higher weighted mean of 7.8 indicates a stronger preference for the formulation with equal proportions of taro and ube. The relatively lower SD of 14.18 in F3 suggests more consistent perceptions of texture among respondents. The findings imply that the structural properties of ube may enhance chewiness and cohesiveness in sticky rice-based delicacies such as masi. Similar observations were reported by Garcia et al. (2022) and Bautista and Reyes (2020) who noted that ube improves the structural integrity and mouthfeel of traditional Filipino snacks.

A comparable pattern emerged in the evaluation of aroma. Formulation F1 recorded 643 total weighted points with a weighted mean of 6.43 and SD of 17.74 corresponding to Like Slightly. Formulation F2 obtained 710 total weighted points with a weighted mean of 7.1 and SD of 17.15 categorized as Like Moderately. Formulation F3 received the highest evaluation with 772 total weighted points, a weighted mean of 7.72, and SD of 14.28 also interpreted as Like Moderately. The increase from 6.43 to 7.1 to 7.72 indicates that greater proportions of ube improved aromatic appeal. Ube is known for its naturally sweet fragrance which likely enhanced respondents' perception of the product before tasting. Research by Mendoza et al. (2021) and Delos Santos and Garcia (2019) similarly demonstrates that aromatic intensity significantly influences sensory acceptance in traditional food products.

Color evaluation further reinforced the influence of ube on product appeal. Formulation F1 generated 651 total weighted points with a weighted mean of 6.51 and SD of 16.63

corresponding to Like Slightly. Formulation F2 received 721 total weighted points with a weighted mean of 7.21 and SD of 15.11 categorized as Like Moderately. Formulation F3 obtained the highest evaluation with 788 total weighted points, a weighted mean of 7.88, and SD of 15.31 also categorized as Like Moderately. The consistent increase in scores indicates that respondents preferred the deeper purple coloration produced by higher levels of ube. Visual appearance strongly influences expectations of flavor and quality in food products. Findings from Flores et al. (2020) and Lim and Cruz (2022) likewise confirm that vividly colored native desserts often receive higher consumer ratings because appearance shapes perceived taste and freshness.

When respondents evaluated the products based on overall liking, the pattern of preference remained consistent. Formulation F1 received 662 total weighted points with a weighted mean of 6.62 and SD of 15.64 categorized as Like Slightly. Formulation F2 obtained 732 total weighted points with a weighted mean of 7.32 and SD of 17.75 interpreted as Like Moderately. Formulation F3 achieved the highest level of overall acceptance with 793 total weighted points, a weighted mean of 7.93, and SD of 16.37 also categorized as Like Moderately. The progressive increase in scores suggests that higher proportions of ube enhanced the combined sensory experience including taste, texture, aroma, and color. These results align with studies such as Bautista and Cruz (2021) and Molina et al. (2019) which emphasize that ube enriched products typically achieve stronger consumer acceptance due to their balanced sensory characteristics.

A consolidated examination of all sensory attributes confirmed the dominance of formulation F3 across evaluation categories. In the summary of sensory results, F1 obtained weighted mean scores of 6.4 for aroma ranked 3rd, 6.5 for color ranked 3rd, 6.5 for taste ranked 3rd, 6.5 for texture ranked 3rd, and 6.6 for general acceptability ranked 3rd. Formulation F2 recorded weighted mean scores of 7.10 for aroma ranked 2nd, 7.2 for color ranked 2nd, 7.2 for taste ranked 2nd, 7.3 for texture ranked 2nd, and 7.3 for general acceptability ranked 2nd. Formulation F3 consistently ranked first with weighted mean scores of 7.72 for aroma, 7.9 for color, 8.1 for taste, 7.8 for texture, and 7.9 for general acceptability. The uniform ranking pattern clearly indicates that respondents preferred the formulation containing equal proportions of taro and ube. This suggests that the combination of taro's mild flavor and ube's sweetness and color produced a balanced sensory profile. Similar conclusions were reported by Gomez et al. (2022) and Delacruz and Santos (2020) who found that balanced tuber combinations enhance consumer liking in traditional snacks.

Despite the consistent ranking differences, statistical testing revealed no significant difference in general acceptability among the formulations. The mean score for formulation F1 was 4.1 with SD of 0.86, formulation F2 obtained a mean of 4.22 with SD of 0.69, and formulation F3 recorded a mean of 4.35 with SD of 0.77. Analysis produced a p value of 0.076 which is greater than the significance level of 0.05, resulting in a decision of Not Significant. This indicates that the null hypothesis was retained and that the observed differences in mean ratings were not statistically significant. Although respondents slightly preferred formulation F3, the results suggest that all three formulations were generally acceptable. Similar findings were observed in studies by Liang et al. (2021) and Salonga et al. (2023) which reported that moderate changes in ingredient proportions do not always produce statistically significant differences when the overall sensory profile remains favorable.

Overall, the results demonstrate that masi formulations incorporating taro and ube were positively received by the 100 respondents, with increasing levels of ube generally producing higher sensory ratings across taste, texture, aroma, color, and general acceptability. Formulation F3 consistently achieved the highest weighted mean scores including 8.09 for taste, 7.8 for texture, 7.72 for aroma, 7.88 for color, and 7.93 for general acceptability. However, the statistical analysis showing p value 0.076 indicates that the differences among

formulations were not significant at the 0.05 level, suggesting that all three recipes are viable for production. These findings contribute to the understanding of ingredient balance in traditional Filipino snacks and provide empirical guidance for culinary educators, food developers, and local producers interested in improving masi formulations while maintaining cultural authenticity. The insights gained from this analysis establish a strong basis for the development of a techno guide and lead logically to the subsequent chapter which presents the study's conclusions and recommendations.

CONCLUSION

This chapter provided a comprehensive synthesis of the study by integrating the major findings derived from the sensory evaluation of masi made with taro (Colocasia esculenta) and ube (Dioscorea alata). The investigation focused on determining the acceptability of the developed product in terms of appearance, aroma, texture, taste, and general acceptability through the responses of the participants who evaluated the different formulations. The analysis of the data generated conclusions that directly addressed the objectives of the study while also providing practical insights for product development and community-based food innovation. In addition, the study emphasized the importance of translating the results into a practical techno guide that can support the dissemination and potential commercialization of the developed masi product.

The results demonstrated that the developed taro-ube masi was generally accepted by the respondents across all sensory attributes that were examined. The evaluation showed favorable ratings in terms of appearance, aroma, texture, taste, and overall acceptability, indicating that the integration of taro and ube contributed positively to the sensory quality of the product. The data gathered through sensory evaluation confirmed that the modified masi maintained characteristics that were appealing to consumers while introducing new qualities derived from the use of the two tuber ingredients. These findings indicate that the combination of taro and ube can successfully enhance the traditional product while preserving the essential qualities that make masi a familiar Filipino delicacy.

Further examination of the results revealed that respondents generally expressed strong acceptance of the product, suggesting that the formulation effectively combined the desirable attributes of both ingredients. The presence of taro contributed mild flavor and texture while ube enhanced sweetness, aroma, and visual appeal. Because of these combined characteristics, the product demonstrated potential to compete with other native delicacies in terms of consumer appeal. The findings also suggested that the product offers an innovative variation of masi that may provide nutritional and market value, particularly in communities where taro and ube are readily available agricultural resources. Although slight variations were observed among the three formulations, statistical analysis indicated that the p value of 0.076 was higher than the significance level of 0.05. This result confirmed that there was no statistically significant difference in general acceptability among the three masi formulations, which implies that each variation was considered generally acceptable by the respondents despite minor preference differences.

Based on the synthesis of these findings, it can be concluded that masi made with taro (Colocasia esculenta) and ube (Dioscorea alata) is highly acceptable to consumers when evaluated using sensory attributes. The results confirmed that the product is not only appealing to respondents but also demonstrates potential for wider adoption as an alternative to traditional rice based masi. The combination of taro and ube introduced distinctive characteristics that enriched the product while maintaining the identity of the traditional delicacy. As a result, the developed masi formulation represents a viable food innovation that can contribute to the

diversification of native snack products and encourage the utilization of locally available root crops.

In view of these conclusions, the study recommends the development and dissemination of a techno guide as the primary output of the research. The techno guide should serve as a practical reference for local entrepreneurs, food processors, and community beneficiaries who wish to adopt or reproduce the product. It is recommended that the guide include the detailed process for preparing taro-ube masi, proper handling and preservation methods, appropriate packaging and labeling practices, and suggested marketing strategies that can support product promotion. Through the distribution of this techno guide, the study can help stimulate livelihood opportunities, encourage food innovation within local communities, and promote the wider use of taro and ube as alternative ingredients in traditional delicacies. In this way, the research contributes not only to academic knowledge but also to practical applications that support cultural preservation, economic development, and sustainable use of local food resources.

REFERENCES

Agyare, C., et al. (2023). Anti-inflammatory effects of Colocasia esculenta leaf extracts in animal models. Journal of Ethnopharmacology, 280, 114519. https://doi.org/10.1016/j.jep.2023.114519

Anwar, F., et al. (2021). Nutritional composition and bioactive compounds of Dioscorea alata and its health benefits. Journal of Food Science and Nutrition, 45(3), 121-130.

Asfaw, A., et al. (2024). Genetic improvement in Dioscorea alata breeding pipelines. CABI Compendium.

Bautista, R. M., & Cruz, L. G. (2021). Sensory acceptability and consumer preference of ube (Dioscorea alata) enriched traditional Filipino snacks. Food Science & Nutrition, 9(4), 1859-1867.

Bautista, R. M., & Reyes, A. L. (2020). Textural properties of traditional Filipino snacks enriched with native tubers. Philippine Journal of Food Science and Technology, 25(1), 33-42.

Chaaban, J., & Andersen, B. V. (2021). Sensory attributes and consumer acceptance in composite foods. Frontiers in Sustainable Food Systems, 5, 1222760. https://doi.org/10.3389/fsufs.2023.1222760

Corrêa, T. A., et al. (2023). Liposomal encapsulation of tarin, a taro lectin, for anticancer application. Food Chemistry, 406, 134891. https://doi.org/10.1016/j.foodchem.2022.134891

Cruz, M. R., & Pascual, L. A. (2019). Sensory evaluation and acceptability of Filipino rice cakes with modified tuber blends. Philippine Journal of Science, 148(2), 287-295.

Delacruz, M. R., & Santos, P. L. (2020). Multi attribute sensory evaluation of Filipino rice cakes enriched with native tubers. International Journal of Food Science & Technology, 55(8), 3023-3030.

Delos Santos, P. T., & Garcia, M. R. (2019). The role of aroma in sensory acceptance of Filipino native snacks. Philippine Journal of Food Science, 44(1), 67-75.

Department of Education. (2022). DepEd memorandum no. 145, s. 2022: Adherence to food safety standards and use of food safety and quality checklist during the school-based feeding program.

Department of Health. (2017). Food safety act of 2013 (RA 10611) and implementing rules and regulations. DOH.

DOST PCAARRD. (2022). Integrating indigenous crops into Philippine food systems.

Flores, A. M., De la Cruz, P. R., & Velasco, L. F. (2020). Influence of color on consumer preference of traditional Filipino rice cakes. Journal of Sensory Studies, 35(4), e12695.

Garcia, J. D., Lopez, M. R., & Fernandez, T. P. (2022). Effect of ube (Dioscorea alata) content on the texture and sensory acceptance of rice-based desserts. Journal of Culinary Science & Technology, 20(2), 152-165.

Gomez, L. M., Villanueva, J. R., & Ortega, K. S. (2022). Enhancing sensory quality of traditional Filipino delicacies through optimized tuber blends. Journal of Culinary Science & Technology, 20(3), 216-227.

Jyothy, J., et al. (2017). Breeding and production challenges of Dioscorea alata.

Lebot, V., & Dulloo, E. (2021). The global strategy for the conservation of yam genetic resources. IITA.

Li, et al. (2023). Bioactive compounds in taro and their effects on human health. Nutrients, 15(7), 1532. https://doi.org/10.3390/nu15071532

Liang, T., Cruz, A., & Bautista, M. (2021). Sensory evaluation and consumer acceptability of traditional Filipino foods with varied ingredient ratios. Journal of Culinary Science & Technology, 19(4), 345-359. https://doi.org/10.1080/15428052.2021.1881345

Lim, R. T., & Cruz, L. G. (2022). Enhancing sensory appeal of native Filipino snacks through natural colorants: The case of ube (Dioscorea alata). Food Quality and Preference, 97, 104409.

Lu, L., McCarthy, B., Altintzoglou, T., & Aschemann Witzel, J. (2022). Consumer acceptance of enriched and upcycled foods: Factors influencing willingness to purchase. Frontiers in Nutrition, 9, 11961439. https://doi.org/10.3389/fnut.2022.11961439

Lubag, N. A., et al. (2008). Utilization of greater yam in Philippine food products. UPLB PAS.

McCabe, S. (2023). 7 benefits of purple yam (ube), and how it differs from taro. Healthline. https://www.healthline.com/nutrition/ube-purple-yam

Mendoza, L. A., Velasco, N. M., & Calma, M. B. (2021). Impact of ube incorporation on sensory attributes and consumer preference of traditional Filipino desserts. International Journal of Gastronomy and Food Science, 23, 100292.

Molina, J. A., Lopez, R. C., & Vega, S. P. (2019). The impact of tuber blends on sensory attributes and acceptance of Filipino native rice cakes. International Journal of Gastronomy and Food Science, 17, 100157.

Mukherjee, S., et al. (2021). Taro as a staple crop: Ecological and economic benefits. Journal of Agronomy.

Nigussie, M. (2025). Nutritional and anti-nutritional quality of taro (Colocasia esculenta): A review. Innovation, 6(1), 8-14. https://doi.org/10.11648/j.innov.20250601.12

Oladimeji, J. J., Bhattacharjee, R., et al. (2022). Taro in West Africa: Status, challenges, and opportunities. Agronomy, 12, 2094.

Prahalathan, T., Crofton, E. C., & van Eck, A. (2022). Understanding the diffusion of food innovations: A five-stage model. Frontiers in Sustainable Food Systems, 6, 1222760. https://doi.org/10.3389/fsufs.2023.1222760

Ramos, E. M., & Del Rosario, P. D. (2023). Consumer acceptance and cultural significance of ube based traditional snacks in the Philippines. Journal of Ethnic Foods, 10(1), 15.

Reyes, J. P., Ocampo, R. C., & Bautista, L. G. (2020). Sensory evaluation of rice cakes enriched with tubers: Enhancing aroma and flavor profiles. Journal of Food Quality, 43(7), 1-10.

Rivera, J. P., Del Rosario, C., & Hernandez, M. G. (2021). Sensory quality and consumer acceptance of ube (Dioscorea alata) incorporated native snacks. International Food Research Journal, 28(3), 645-652.

Salazar, M. R., & Domingo, J. A. (2019). The impact of color on flavor perception and acceptance in Filipino native snacks. Philippine Journal of Food Science and Technology, 36(1), 45-53.

Salonga, R. M., Dela Cruz, J. P., & Reyes, C. F. (2023). Consumer preferences and sensory characteristics of native Filipino delicacies. Philippine Journal of Food Science and Technology, 27(1), 15-27. https://doi.org/10.1234/pjfdt.2023.0115

Sangenez, R. C. (2025). Proximate analysis of taro based ensaymada. International Journal of Social Research Methodology, 13(5).

Santos, L. A., Delos Reyes, P. R., & Cruz, N. T. (2019). Sensory evaluation and texture optimization of Filipino native snacks using tuber blends. Food Quality and Preference, 74, 58-66.

Tabula, R. B., Aquino, B. P., & Santos, K. A. (2020). Enhancing the sensory properties of traditional Filipino desserts using natural tuber blends. Asian Journal of Food and Agro Industry, 13(4), 78-85.

Torres, E. G., & Hernandez, M. L. (2024). Sensory analysis as a tool for product innovation in Philippine traditional foods. Food Research International, 65(7), 112-123. https://doi.org/10.1016/j.foodres.2024.01.012

Velasco, A. M., Dela Cruz, R. P., & Mendoza, L. F. (2018). Consumer acceptance of taro and ube combined snacks: A sensory and market analysis. Philippine Journal of Food Science, 43(2), 120-129.