

Optimization of Ubi Kinampay (*Dioscorea Alata*) Egg Tart Crust through modified baking parameter

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ABSTRACT

This study explores the optimization of Ubi Kinampay (*Dioscorea alata*) egg tart crust through modified baking parameters to enhance its texture, sensory qualities, and overall consumer appeal. Ubi Kinampay, known for its distinct flavor and vibrant color, was incorporated into the tart crust while evaluating the effects of varying temperature, baking time, and blind baking methods. Using a design of experiments, three baking treatments were assessed: T1 (lower temperature, longer baking time), T2 (higher temperature, shorter baking time), and T3 (blind baking method). The crusts were analyzed based on aroma, taste, appearance, texture, and overall acceptability. Statistical analyses were conducted to evaluate the collected data. Descriptive statistics, including means and standard deviations, summarized the central tendencies and variability of the samples. Inferential statistical tests, such as Analysis of Variance (ANOVA) and t-tests, compared treatment effects based on the study's design and objectives. A significance level of $p < 0.05$ determined statistical significance, and post-hoc tests identified specific differences among treatment groups. The analysis validated the hypotheses and clarified findings related to the nutritive value and sensory evaluation of the products. Findings from this research provide insights into optimizing baking conditions for a highly palatable Ubi Kinampay egg tart crust, improving its market potential. The results also serve as a foundation for developing innovative baking techniques that can enhance local food production and support the expansion of Ubi Kinampay-based bakery products for wider commercial and export opportunities.

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INTRODUCTION

This study explores the optimization of Ubi Kinampay (*Dioscorea alata*) egg tart crust by modifying baking parameters to enhance its quality, texture, and sensory attributes, contributing to advancements in food processing and culinary techniques. It holds significant academic value as it expands the growing body of research in food science and culinary technology, particularly in the optimization of baking parameters for innovative pastry formulations. By investigating the modified baking conditions of Ubi Kinampay egg tart crust, this research deepens understanding of ingredient interactions and processing variables that influence product quality and consumer acceptability. The study also emphasizes the practical implications for local producers and entrepreneurs, offering cost-effective and efficient baking techniques that can enhance the appeal of Ubi Kinampay-based products while promoting the utilization of indigenous crops to support sustainable agriculture and food security.

Positioned at the intersection of food science, innovation theory, and local food heritage, the research advances both scientific knowledge and practical applications of Ubi Kinampay in baked goods. It aligns with national policies promoting food safety, research innovation, and the sustainable use of indigenous resources. Specifically, the study examines three key units of analysis: the physical and sensory qualities of Ubi Kinampay egg tart crusts subjected to varying baking parameters; the nutritional content and safety compliance of the resulting products; and the economic potential and cultural significance of Ubi Kinampay-based baked products within local communities and markets. These areas collectively contribute to a comprehensive understanding of how local food innovation can bridge the gap between tradition and modern culinary science.

Existing literature highlights a growing interest in integrating indigenous ingredients such as Ubi Kinampay into contemporary food applications, especially in bakery and pastry production. Alonzo et al. (2021) underscore the potential of local root crops to enhance nutritional value, flavor, and consumer appeal, aligning with global movements toward natural, sustainable, and locally sourced ingredients. Similarly, Tan et al. (2022) demonstrate that the adjustment of baking parameters—specifically temperature and time—can significantly improve the texture, structure, and overall quality of baked products like egg tarts. These findings collectively support the premise that careful manipulation of baking conditions can optimize both the functional and sensory attributes of food products derived from indigenous ingredients.

The study is also anchored in theoretical frameworks that contextualize innovation and consumer behavior in food production. Schumpeter's Innovation Theory (1934) posits that product and process innovations drive economic development and market competitiveness, highlighting the role of technological creativity in culinary advancement. Complementarily, Sabelli's Bios Theory of Innovation (2008) emphasizes adaptive, knowledge-based innovation that harmonizes with environmental and cultural contexts—an approach consistent with utilizing Ubi Kinampay as a sustainable local ingredient. Poulos's Nutritional Behaviour Theory (2018)

adds a behavioral dimension, stressing that understanding consumer preferences and nutritional behaviors is critical to enhancing the acceptability and health value of food innovations.

Despite these theoretical and empirical advancements, notable gaps remain in the existing literature. Current studies often isolate either the nutritional aspects of indigenous ingredients or the technical optimization of baking, with few integrating both domains to create a holistic model of product improvement. Furthermore, there is limited empirical evidence examining the specific effects of modified baking parameters on Ubi Kinampay-based crusts within a framework that simultaneously considers scientific, cultural, and economic factors. Equally underexplored is the role of national legal and policy frameworks—such as the Philippine Constitution, the National Bakery Policy Act, and the Philippine Innovation Act—in shaping the development, standardization, and commercialization of indigenous food products. By addressing these gaps, the present study contributes a multidimensional perspective that advances both scholarly inquiry and practical innovation in the Philippine food industry.

Statement of the problem

This study aims to determine how baking parameters can be optimized to enhance the quality, safety, and marketability of Ubi Kinampay (*Dioscorea alata*) egg tart crusts, thereby promoting the utilization of indigenous ingredients within the framework of food innovation and existing legal policies. The research seeks to bridge the gap between culinary science, nutrition, and local economic development by identifying effective baking practices that improve both the technical and sensory characteristics of Ubi Kinampay-based products. Furthermore, it explores how such innovations align with sustainability goals and contribute to the advancement of culturally grounded and policy-compliant food technologies.

Specifically, this study seeks to answer the following questions:

1. What baking temperature and time combination can be identified as optimal for improving the texture, flavor, and sensory appeal of Ubi Kinampay egg tart crusts?
2. How can the nutritional composition and food safety of the optimized Ubi Kinampay egg tart crust be evaluated and ensured?
3. What are the potential economic and cultural benefits of incorporating Ubi Kinampay into baked products within the context of existing legal and policy frameworks?
4. How can the findings of this study contribute to the development of sustainable and innovative food products that leverage indigenous ingredients in support of local and national priorities?

METHODOLOGY

This study employed a quantitative experimental research design to systematically examine the effects of controlled baking parameters on the quality of Ubi Kinampay (*Dioscorea alata*) egg tart crusts. The design was chosen because it allowed the researcher to investigate the impact of controlled variables—specifically baking time, temperature, and method—on measurable outcomes related to texture, flavor, and overall sensory appeal. The primary objective was to optimize these parameters to enhance the crust's quality and to generate

empirical data supporting the effectiveness of each treatment. The experimental setup involved multiple trials conducted under controlled conditions to ensure reliability and consistency of results. Quantitative data were collected through objective measures such as texture analysis, moisture content determination, and sensory evaluation. The use of statistical tools, particularly Analysis of Variance (ANOVA), facilitated the identification of significant differences between treatment groups and the determination of which combinations of temperature and time produced the most favorable results for Ubi Kinampay egg tart crusts.

The study was conducted at Mambajao National High School in the province of Camiguin, where the Cookery, Bread and Pastry Production, and Food and Beverage Services programs provided the necessary facilities and participants. These programs offered an appropriate setting for the experimental and evaluative components of the study due to their focus on practical culinary applications. The participants included students enrolled in these programs and teachers handling the same subjects, as they possessed the relevant knowledge and experience required to accurately assess the sensory qualities of the baked products. Using purposive sampling, a total of ninety respondents were selected based on their competence in evaluating baked goods and their willingness to participate. Total enumeration was also applied to include all qualified respondents within the selected programs, ensuring comprehensive data representation. This sampling strategy provided a knowledgeable and skill-based respondent pool capable of providing accurate and meaningful evaluations of the sensory attributes of the Ubi Kinampay egg tart crusts.

Data collection was conducted using a modified survey questionnaire designed for sensory evaluation. The instrument was adapted from the Hedonic Scale developed by Gatchalian and subsequently modified to align with the objectives of this research while maintaining its validity and reliability. The questionnaire was used to determine respondents' levels of preference in terms of aroma, color, taste, and texture across the three experimental treatments. Responses were rated on a four-point scale, with a rating of 4 representing the highest level of preference for the enhanced crust quality of Ubi Kinampay egg tart and a rating of 1 indicating the lowest preference. Before data collection, the researcher secured written authorization from the Department of Education Division of Camiguin and the principal of Mambajao National High School. The request outlined the purpose of the study and ensured that ethical research standards, including voluntary participation and confidentiality of responses, were upheld.

The experiment was conducted in three main phases. During the pre-data gathering phase, the researcher formally sought approval from the appropriate authorities and refined the data collection instruments. The experimental phase consisted of three trials using distinct baking parameters to identify the optimal combination for enhanced crust quality. In the first trial, the egg tart crusts were baked at a lower temperature of 180°C (350°F) for 60 minutes. This treatment aimed to assess how prolonged baking at moderate heat affected the softness and consistency of the crust. The second trial used a higher temperature of 200°C (392°F) for 15 minutes, targeting a crispier exterior and more even bake. The third trial employed a blind baking method at 425°F (220°C) for 15 minutes, pre-baking the crust to ensure uniform doneness and to minimize sogginess when filled with custard. The blind baking method was expected to yield a crunchy, evenly baked crust, an essential quality for tarts containing liquid fillings. Each treatment was replicated multiple times to ensure consistency, and results were documented

carefully for comparison. After the final trial achieved the desired sensory attributes, the optimized crust was subjected to laboratory analysis to determine its nutritional composition and food safety compliance.

The preparation of ingredients, tools, and equipment played a crucial role in ensuring the accuracy and reproducibility of the results. The primary ingredient, Ubi Kinampay, was boiled and mashed until smooth, providing its characteristic purple hue and sweet flavor to the tart. Other ingredients included all-purpose flour, sugar, milk, butter, and eggs, each measured precisely using standard measuring tools to ensure uniform quality across trials. Equipment such as mixing bowls, measuring spoons, rolling pins, tart pans, and ovens were prepared beforehand, and a sieve was used to achieve a lump-free custard mixture. The baking process began with dough preparation for the crust, followed by the formulation of the custard filling that incorporated mashed Ubi Kinampay. The crust was rolled, molded, and pre-baked to establish a stable base before the custard filling was poured and baked according to each treatment's specific temperature and time combination. After baking, the tarts were cooled on a wire rack to maintain structural integrity and prevent overcooking. The cooled samples were then subjected to sensory evaluation by the selected participants.

Data gathering combined laboratory testing and consumer sensory evaluation to ensure a comprehensive assessment of product quality. Laboratory analysis focused on determining moisture content, texture, flavor, and microbial stability to evaluate freshness and shelf-life. Tarts were stored under controlled conditions and monitored after 24 hours to assess changes in taste, appearance, and microbial safety. Simultaneously, product tasting sessions were conducted with the respondents to gather data on consumer perception and acceptability. Questionnaires using the Hedonic Scale were distributed and collected in person to ensure accurate recording of responses. These sessions were conducted at different stages—before, during, and after baking—to capture immediate feedback and guide recipe refinement. This iterative process helped identify improvements in flavor balance, crust texture, and overall consumer preference.

Data were analyzed using both descriptive and inferential statistical techniques. The weighted mean was employed to determine the sensory attributes of appearance, aroma, taste, and texture across the three treatments. The results were interpreted using a standardized scale: scores from 3.26–4.00 indicated “Strongly Preferred,” 2.51–3.25 as “Moderately Preferred,” 1.76–2.50 as “Slightly Preferred,” and 1.00–1.75 as “Not Preferred.” The same scale was used for interpreting the four-point Hedonic ratings, providing consistent interpretation across all sensory measures. To examine the relationship between baking temperature and crust quality, Spearman's rho correlation coefficient was utilized. Furthermore, to identify significant differences in preference ratings among the three treatments, a one-way ANOVA was performed, followed by the Scheffé test to pinpoint specific differences between mean values. All test statistics were compared with critical values at the 0.05 level of significance. Data analyses were conducted using Microsoft Excel to ensure accurate computation and presentation of results.

Ethical considerations were strictly observed throughout the research process. Participants were informed about the objectives of the study, the voluntary nature of their involvement, and the confidentiality of their responses. Permission from school authorities ensured compliance with institutional and educational research protocols. By integrating

scientific rigor with ethical integrity, the study maintained transparency and accountability in its execution.

Through this systematic and comprehensive methodology, the research combined experimental precision, quantitative measurement, and sensory evaluation to develop an optimized Ubi Kinampay egg tart crust. The inclusion of laboratory testing, controlled baking trials, and sensory assessment ensured the reliability and validity of findings. Overall, the methodological approach demonstrated how scientific experimentation could be effectively applied to local culinary innovation, promoting the sustainable use of indigenous ingredients while advancing the field of food science and technology.

RESULTS AND DISCUSSION

This study involved ninety (90) participants composed of students and teachers from Mambajao National High School who were enrolled in or teaching Cookery, Bread and Pastry Production, and Food and Beverage Services. They were selected through purposive sampling based on their knowledge, skills, and ability to provide accurate evaluations of the Ubi Kinampay (*Dioscorea alata*) egg tart crusts. The participants assessed the products' sensory characteristics—including aroma, color, taste, and texture—across three experimental baking treatments: Treatment 1 (lower temperature with longer baking time at 180°C for 60 minutes), Treatment 2 (higher temperature with shorter baking time at 250°C for 15 minutes), and Treatment 3 (blind bake method at 220°C with 15 minutes pre-baking and 25 minutes final baking). The study also examined the nutritional composition, microbial safety, and marketability of the optimized Ubi Kinampay egg tart. Data were analyzed using Weighted Mean, Spearman's rho correlation coefficient, and one-way Analysis of Variance (ANOVA) with Scheffé post hoc tests at a 0.05 level of significance.

The profile of the Ubi Kinampay egg tart crust included a detailed analysis of its ingredients, costs, tools, and procedures. Each treatment had an identical formulation to ensure comparability, with differences only in baking parameters. The ingredients for the filling were composed of 120 grams of Ubi Kinampay priced at ₱200 per 1,500 grams (₱15.60 per batch), 67 grams of granulated sugar at ₱73.95 per 1,000 grams (₱4.96), 250 milliliters of milk at ₱92.45 per 1,000 milliliters (₱23.00), three eggs at ₱117.60 per dozen (₱29.40), 4.9 milliliters of vanilla extract at ₱25 per 120 milliliters (₱1.03), and 118 milliliters of water at ₱30 per 1,000 milliliters (₱3.55). The crust ingredients consisted of 240 grams of all-purpose flour at ₱50 per 1,000 grams (₱12.00), one egg at ₱9.80, 194 grams of butter at ₱75.80 per 200 grams (₱73.53), and 250 grams of mashed Ubi Kinampay at ₱200 per 1,500 grams (₱32.50). The aluminum packaging box cost ₱3.77 per unit. The total raw material and packaging cost per treatment amounted to ₱209.14. Adding 10% operating expenses (₱20.91), 10% direct labor (₱20.91), and a 30% markup (₱62.74) brought the total to ₱313.70 per batch. Each batch yielded thirty-five (35) egg tarts weighing approximately 20 grams each, resulting in a selling price of ₱8.96 per piece. This cost structure demonstrated that the product could be standardized and replicated efficiently for potential commercial production while maintaining affordable pricing and profitability.

The baking process required precise preparation and the use of various kitchen tools and equipment to maintain consistency and product quality. Mixing bowls, measuring cups and spoons, and a weighing scale were used for accurate measurements, while a rolling pin ensured

even crust thickness. A mini muffin tray was essential for portion control and consistent shaping, and a large pot and peeler were necessary for boiling and preparing the Ubi Kinampay. Additional tools such as wire whisks, small stainless-steel bowls, and plastic wraps maintained ingredient freshness and uniformity. The gas range provided heat control during baking, allowing precise temperature adjustments. The process began by washing and boiling the Ubi Kinampay until soft, cooling it for 5–10 minutes, peeling it, and mashing it through a colander to achieve a fine texture. For each treatment, 250 grams of mashed Ubi were weighed and divided equally for use in both the crust and filling. The crust was prepared by forming a butter block (mixing sliced butter, flour, and half of the mashed Ubi) and a dough block (mixing egg, cold water, and the remaining Ubi). Both blocks were refrigerated for 1–2 hours before being laminated together, rolled into a uniform sheet, and formed into tart molds. The filling was prepared by making a sugar syrup, then combining it with eggs, milk, vanilla extract, and the measured mashed Ubi. The filling mixture was poured into each pre-shaped crust and baked according to the treatment conditions. After baking, the tarts were cooled for 5 minutes before serving and evaluation.

Shelf-life testing showed that the sensory attributes of the Ubi Kinampay egg tarts varied between refrigerated and room-temperature storage across the three treatments. On the first day, all treatments exhibited a golden to medium-brown color, pleasant aroma, sweet taste, and flaky to slightly flaky texture. For the first two days, no changes were observed under both storage conditions. By the third day, refrigerated tarts retained their flakiness, while room-temperature samples began to lose crispness. On the fourth day, all room-temperature samples were marked as spoiled across color, aroma, taste, and texture, while refrigerated tarts remained unchanged up to the seventh day. By the eighth day, refrigerated tarts maintained their color, aroma, and taste but had lost their flakiness, transitioning to a slightly dense texture. By the ninth day, all tarts under both conditions showed signs of spoilage. These findings demonstrated that refrigeration extended shelf life by four to five days compared to room temperature, highlighting its importance for maintaining product quality and delaying microbial spoilage.

Nutritional analysis revealed that the Ubi Kinampay egg tart crust contained 1.14% ash, 4.78% crude protein (Kjeldahl method), and 14.2% fat (Mojonnier extraction method). The water activity (*aw*) was measured at 0.770 at 22.6°C, indicating acceptable stability for bakery products. Sodium content was recorded at 774 mg/kg, total sugar at 24.6%, and moisture at 21.25 g/100g, with dietary fiber at 1.42 g/100g. The cholesterol level was 9.58 mg/100g, and the caloric value was calculated at 381 kcal/100g. These findings indicated that the Ubi Kinampay egg tart crust is moderately energy-dense, with a desirable balance between sweetness and fat but limited dietary fiber. The relatively low water activity level supports a longer shelf life when stored properly. The results also suggest that while the product offers a flavorful and appealing pastry option, its sugar and fat content should be moderated for frequent consumption.

Microbiological testing confirmed that the Ubi Kinampay egg tart crust was free of *Salmonella spp.* per 25g sample based on the conventional Bacteriological Analytical Manual (BAM Online) standard method. This result verified that the product was safe for consumption and hygienically prepared. The negative microbial findings validated the effectiveness of the production process and adherence to food safety standards, making the product suitable for wider distribution and retail commercialization.

Marketability testing was conducted by consigning the product to four local establishments in Camiguin: Kelly Store (Camiguin Airport), Abucejo Store (Balbagon Port), Mambajao Pasalubong Center, and Kinamigin Food Hub. Sales monitoring over seven days revealed strong initial demand, particularly at Kinamigin Food Hub on Day 1, but a gradual decline by Day 3 across all outlets. By Day 6, most stocks had been sold or reduced significantly, while Day 7 recorded minimal or no remaining stock. The decline was attributed to the limited shelf life of the product and the absence of aggressive marketing efforts. Despite the decline, early consumer response indicated potential for commercial success, suggesting that continuous supply, promotional activities, and improved packaging could enhance market sustainability. The sales trend reflects consumer receptiveness toward indigenous-based products while emphasizing the importance of freshness and presentation in influencing purchasing decisions.

The sensory evaluation conducted among the ninety respondents compared the three baking treatments in terms of appearance, aroma, taste, and texture. Treatment 3, which employed the blind baking method, consistently received the highest ratings across all attributes. It was described as having a “Golden Brown” appearance (mean = 3.5), “Pleasant” aroma (mean = 3.5), “Slightly Sweet” taste (mean = 3.4), and “Flaky” texture (mean = 3.5), achieving the highest overall weighted mean of 3.581, interpreted as “Strongly Preferred.” Treatment 1 scored slightly lower, with a mean of 3.233, described as “Moderately Preferred,” while Treatment 2 obtained an overall mean of 2.817, also classified as “Moderately Preferred.” These results demonstrated that the blind bake method produced superior quality in appearance, flavor, and texture compared to the other two treatments, as it allowed even heat distribution and effective moisture control, resulting in a crisp yet tender crust.

Further statistical analysis using ANOVA confirmed a significant difference among the three treatments ($F = 37.474$, $p < 0.0001$), indicating that variations in baking temperature and duration significantly affected consumer preference levels. The Scheffé test revealed that Treatment 3 significantly differed from Treatments 1 and 2 in favor of overall sensory appeal. Spearman’s rho correlation analysis revealed a weak negative relationship between baking temperature and aroma ($r = -0.28$, $p = 0.004$), suggesting that higher temperatures slightly decreased the aromatic quality of the crust. No significant correlations were observed between baking temperature and taste, appearance, or texture, indicating that these attributes were more influenced by other baking factors and ingredient interactions rather than temperature alone.

The study’s findings led to the development of a technology diffusion plan for the optimized Ubi Kinampay egg tart crust. This plan aims to transfer the baking technology to local communities, particularly women’s groups, culinary students, and small-scale food entrepreneurs, to promote livelihood and sustainable food innovation. The program includes demonstrations, workshops, and printed instructional materials distributed across educational and community centers. The expected outcomes include enhanced technical skills among participants, increased awareness of Ubi Kinampay’s economic and nutritional potential, and broader adoption of indigenous-based innovations.

In summary, the study concluded that the blind bake method (Treatment 3) produced the best results in terms of sensory quality, preference level, and overall acceptability. The Ubi Kinampay egg tart crust was confirmed to be microbiologically safe, moderately nutritious, and economically viable. Refrigeration was proven to extend the product’s shelf life up to eight days while maintaining sensory attributes. The consistent findings across treatments and replicable

production cost of ₱8.96 per piece indicated strong potential for commercialization. This research not only advances food science and product innovation using indigenous crops but also contributes to local economic empowerment through sustainable culinary practices in Camiguin and similar regions.

CONCLUSION

The study sought to enhance the texture, sensory qualities, nutritional value, and marketability of a product that integrates indigenous Filipino ingredients with modern baking practices. Through a quantitative experimental design conducted at Mambajao National High School, ninety (90) participants—composed of students and teachers in the fields of Cookery, Bread and Pastry Production, and Food and Beverage Services—assessed the effects of varying baking parameters across three treatments: lower temperature with longer baking time (T1), higher temperature with shorter baking time (T2), and blind baking method (T3). The results provided strong empirical evidence that optimizing temperature and time significantly influences the sensory profile, product stability, and consumer appeal of Ubi Kinampay-based baked products.

The findings demonstrated that baking parameters and ingredient ratios had a marked effect on the sensory qualities of the egg tart crust, particularly in terms of appearance, aroma, taste, and texture. Treatment 3, which utilized the blind baking method at 220°C (425°F) with a 15-minute pre-bake and a 25-minute final bake, consistently received the highest ratings, described as “Golden Brown,” “Pleasant,” “Slightly Sweet,” and “Flaky.” It obtained an overall weighted mean of 3.581, interpreted as “Strongly Preferred.” Treatments 1 and 2, meanwhile, yielded lower ratings of 3.233 and 2.817, respectively, both categorized as “Moderately Preferred.” Statistical analysis through one-way ANOVA confirmed significant differences among the treatments ($F = 37.474$, $p < 0.0001$), emphasizing that controlled variations in baking temperature and duration directly affect consumer acceptability. Spearman’s rho correlation results revealed a weak negative relationship between baking temperature and aroma ($r = -0.28$, $p = 0.004$), indicating that excessive heat may diminish volatile aromatic compounds without significantly altering taste or texture. These findings affirm that the blind bake method produces the most balanced sensory outcomes and should be considered the optimal baking technique for Ubi Kinampay egg tarts.

The product’s profile further revealed economic feasibility and scalability. Each treatment required an ingredient and packaging cost of ₱209.14, with added operating expenses and labor costs amounting to 10% each and a 30% markup, resulting in a total of ₱313.70 per batch. Each batch produced thirty-five (35) tarts weighing approximately 20 grams each, priced at ₱8.96 per piece. The cost analysis indicated that production is economically viable and reproducible under standardized conditions, making it suitable for small-scale commercial ventures or micro-enterprises. The preparation process relied on accurate measurements, proper lamination techniques, and consistent baking procedures, highlighting the importance of culinary precision in achieving desirable quality and uniformity in each batch.

The shelf-life analysis provided further insight into product stability and quality retention. Under room temperature, all treatments began to show spoilage on the fourth day, whereas those

kept under refrigeration retained acceptable sensory qualities up to the eighth day. By the ninth day, however, all samples were deemed spoiled, regardless of treatment or storage. This finding underscores the significance of refrigeration in prolonging shelf life by four to five days while maintaining desirable aroma, texture, and flavor. Nutritional analysis revealed that the Ubi Kinampay egg tart crust contained 1.14% ash, 4.78% crude protein, and 14.2% fat, along with 774 mg/kg sodium, 24.6% total sugar, and 1.42 g/100g dietary fiber. The water activity (a_w) of 0.770 at 22.6°C indicated strong shelf stability and reduced susceptibility to microbial growth. The caloric value was computed at 381 kcal/100g, consistent with standard pastry products. Although the product's sugar and fat contents warrant moderate consumption, its low cholesterol level of 9.58 mg/100g presents a favorable nutritional profile compared to conventional pastries.

Microbiological analysis confirmed the product's safety, showing no presence of *Salmonella* spp. per 25-gram sample using the Bacteriological Analytical Manual (BAM Online) standard method. This validation ensures the product's compliance with food safety standards, reinforcing its suitability for consumption and potential for wider distribution. Marketability testing through four local outlets—Camiguin Airport (Kelly Store), Abucejo Store (Balbagon Port), Mambajao Pasalubong Center, and Kinamigin Food Hub—showed strong initial demand, particularly in tourist-heavy areas, but declining sales by Day 6, attributed to product perishability and the absence of active marketing efforts. Nevertheless, the product's early popularity reflects consumer openness to indigenous, innovative, and visually appealing baked goods.

From an economic and entrepreneurial perspective, the Ubi Kinampay egg tart crust is not only feasible but also promising for commercialization. The standardized cost structure and optimized baking process can serve as a foundation for local livelihood programs and small business ventures. The proposed technology diffusion plan reinforces this objective by promoting community-based innovation through demonstrations, workshops, and educational outreach in schools and local government units. The plan aims to transfer knowledge on the optimized baking technique, enhance food safety awareness, and encourage the use of indigenous resources, particularly among local bakers, women's organizations, and students. This initiative is expected to increase local production, generate employment, and strengthen the utilization of Ubi Kinampay as a value-added ingredient.

The study concludes that the optimization of baking parameters—specifically through the blind baking method—successfully enhanced the sensory quality, texture, and consumer preference for Ubi Kinampay egg tart crusts. The product demonstrated desirable nutritional properties, microbiological safety, and economic viability, making it suitable for small-scale commercialization. Refrigeration was found to significantly extend shelf life, ensuring quality retention and minimizing spoilage. The strong consumer response affirms that integrating indigenous ingredients into contemporary food products not only fosters culinary innovation but also supports sustainable agriculture and local economic development. It is therefore recommended that future studies focus on reformulating the product to reduce sugar and fat content for improved nutritional balance, developing long-term preservation and packaging methods to extend shelf life, and implementing robust marketing strategies to maintain consumer interest. Additionally, continued research and collaboration among educational institutions, local government units, and food industries are encouraged to sustain the commercial viability of Ubi

Kinampay-based baked products, strengthening their role in promoting Filipino food heritage and innovation.

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