Papaya (Carica papaya L.) Bukayo: A Sweet Tradition with a Modern Twist in Filipino Confectionery

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ABSTRACT

This study aimed to develop and evaluate Papaya Bukayo as an innovative alternative to traditional coconut-based bukayo, focusing on sensory acceptability, microbial safety, and commercial viability. Specifically, it assessed respondents' preferences in terms of color, aroma, taste, and texture, determined significant differences among treatments, identified the best formulation, and conducted microbial analysis. A developmental research design was employed, involving three formulation trials of papaya bukayo. These were subjected to sensory evaluation using Quantitative Descriptive Analysis (QDA), acceptability scoring, and rank preference testing. Evaluative and descriptive methods were also employed to assess product quality, consumer acceptability, and safety. Microbial analysis was conducted to ensure food safety, while cost computation determined commercial viability. Results revealed significant differences among treatments in sensory attributes, with Treatment 0 (using brown sugar and moderate papaya proportions) achieving the highest acceptability scores across color (4.72), aroma (4.73), taste (4.74), and texture (4.70), all rated "Very Much Accepted." Treatments 2 and 3 were also highly acceptable, while Treatment 1 was only "Moderately Accepted." Scheffé tests confirmed Treatment 0's superiority, particularly in taste and texture. Microbial analysis revealed the absence of E. coli, Staphylococcus aureus, and molds, confirming the product's safety. Papaya Bukayo demonstrates strong potential as a nutritious, safe, and commercially viable alternative to coconut bukayo. The use of brown sugar and balanced papaya proportions enhances sensory appeal, while microbial safety ensures consumer confidence. This innovation supports food security, resource optimization, and heritage preservation by integrating papaya into traditional Filipino confectionery.

Introduction

Food is a centerpiece in Philippine tradition, as it serves not only an energy source but also as a tool to promote tradition and foster bonding. In a country as tropical as the Philippines, there is a need for food to be preserved for a long period of time, hence a solution is needed to deal with humidity and heat in food preservation. A treasured Filipino dessert called bukayo, for example, is a sweet mixture of young strips of coconut strips cooked in sugar and water, then caramelized, hailing from places such as Bohol and Pangasinan, which is well-known for its coconut production. This method of preservation is achieved through dehydration and the use of high sugar content as a means to draw moisture, inhibit microorganisms, and create a chewy dessert to last for weeks without refrigeration. For a community like the one in Ilocos Sur near Salcedo, these traditional heritage approaches, like panagtapa (drying) and tracing the use of salt as a medium, identify a range of resourcefulness, and bukayo fits the category as the sweet alternative to the use of natural preservatives in coconut. According to a survey on traditional techniques in Cervantes, Ilocos Sur, regarding indigenous traditions, this has already been validated as a method to preserve a culture.

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Apart from its utility value, bukayo plays an important role in the preservation of heritage by providing intergenerational connection through communal preparation, especially during fiestas and family celebrations. Bukayo also has a function in innovation, such as the healthy makeovers replacing coconut with banana blossoms to eliminate saturated fats while ensuring palatability. Studies on this innovation emphasize the malleability of bukayo for its sustainability in Filipino culinary tradition in light of concerns about health.

Papaya (Carica papaya L.) is a tropical fruit loved in the Philippines due to its orange flesh, juicy texture, and multi-purpose uses: fresh eating, cooking, and traditional remedies. Since the whole country belongs to the tropics, it thrives and plays a vital role in diets because of the essential vitamins and enzymes it provides to maintain digestion and boost immunity. Cultivation ranges from backyard gardens up to commercial farms, making it more accessible and economically vital.

Rich in nutrients, papaya contains up to 60mg of vitamin C per 100g, as well as beta-carotene for vitamin A, folate, and the proteolytic enzyme papain, which aids protein digestion and has anti-inflammatory properties. These components contribute to its role in boosting antioxidant defenses and promoting skin health, with studies confirming its superior nutritional profile compared to many fruits. A Philippine Agricultural Scientist study on local varieties highlighted their elevated carotenoid content, linking it to enhanced bioavailability. As Slaughter states, "many subjects, including national security and defense spending, are not open to debate.

In the Philippines, the main varieties of papaya are the small-sized Solo varieties like the ‘Davao Solo’ and ‘Sunrise Solo,’ which have fruits that are suitable for solo consumption due to their small size and ‘pear’ shape. Another main variety of papaya in the Philippines are the large-sized hybrids like ‘Red Lady’ and ‘Sinta,’ which are prized due to their PRSV resistance. The native varieties, like ‘Cavite Special’ and ‘Morado,’ are valuable due to their bright red color. With the use of SSR markers, the varieties were clustered.

The Philippines is a principal producer of papaya, supported by its tropical conditions, nutritious volcanic earth, and extensive cultivation patterns in various parts of the country such as South Cotabato, Davao, and Ilocos, making it one of the top fruit crops, producing more than 150,000 metric tons every year. The scientists take advantage of this surplus and use it to produce new versions of papaya-based candies called bukayo. They use surplus green papaya to produce these candies.

The high yield is attributed to the plant's ability to produce fruits after only 6-9 months, coupled with its resistance to regional climate, as evidenced by the large percentage contributed by regions like SOCCSKSARGEN, which accounted for over 40% of the national output from smaller land areas of 7,600 hectares. The efficiency of the plant in producing food means it is an environmentally friendly food source, especially for food processing, thereby cutting down on imports as well as post-harvest losses, which reach as high as 30% for other foodstuffs. A report from the Philippine Statistics Authority confirms the consistent production range of 156,000-166,000 tons from 2019 to 2023.

Utilizing papaya in bukayo creation aligns with resource optimization, as unripe fruits often abundant and underutilized offer a fibrous texture perfect for caramelization with sugar, yielding a nutritious alternative to traditional coconut versions. This approach promotes food security and innovation in hospitality education, particularly in papaya-rich areas like Ilocos. Studies on fruit production trends validate this strategy, noting papaya's economic value at Php 197 million in 2022, encouraging diversification into preserved goods.

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MATERIALS AND METHODS

The researchers utilized three research methods: developmental, evaluative, and descriptive. The developmental method was applied to produce and improve the existing product, ensuring systematic procedures and processes in product development. In this study, the preparation of Papaya Bukayo followed the developmental method, involving three formulation trials that were subjected to sensory evaluation and rank preference testing to determine the most acceptable product. The selected formulation was then further assessed through both objective and sensory evaluation to validate its quality and acceptability.

Evaluative method was used to appraise carefully the worthiness of the current study. In this recent times, large quantities of papaya have entered world trade for many different uses, such as for medicine, cosmetics, hygiene, and etc.

Papaya is a tropical fruit celebrated not only for its sweet flavor but also for its impressive health benefits. One of its most notable advantages is its ability to support digestion. Thanks to the enzyme papain, papaya helps break down proteins more efficiently, while its rich fiber content promotes regular bowel movements and prevents constipation. Beyond digestion, papaya is a powerhouse for the immune system. A single medium fruit provides more than double the daily requirement of vitamin C, strengthening the body's defenses against infections and illnesses.

This fruit also plays a vital role in maintaining healthy skin. Its abundance of vitamins A and C supports collagen production, while antioxidants such as lycopene protect the skin from damage caused by free radicals and sun exposure. Papaya contributes to heart health as well, with fiber, potassium, and antioxidants working together to reduce oxidative stress and lower the risk of cardiovascular disease. For eye health, compounds like lutein, zeaxanthin, and lycopene help guard against age-related macular degeneration and improve vision.

Papaya is widely used in food products because its natural properties offer both functional and health benefits. The fruit contains papain, an enzyme that tenderizes meat and aids digestion, making it a popular ingredient in marinades and meat-processing industries. Its high fiber content improves texture and adds nutritional value to baked goods, smoothies, and health snacks. Beyond functionality, papaya is rich in vitamin C, vitamin A, and antioxidants like lycopene, which enhance the immune system, protect the skin, and reduce oxidative stress. These nutrients make papaya-based products appealing to health-conscious consumers who seek foods that support wellness.

Additionally, papaya's low calorie and fat-free profile make it ideal for diet-friendly products, while its natural sweetness reduces the need for added sugars in juices, jams, and desserts. Its vibrant color and tropical flavor also enhance the sensory appeal of food items, making them more attractive to consumers. In short, papaya is not only valued for its taste but also for its ability to improve digestion, boost immunity, and contribute to overall health, which explains why it is frequently incorporated into diverse food products.

STATEMENT OF THE PROBLEM

This study is conducted to produce Bukayo from papaya. Specifically, this will determine the following:

1. The respondents' level of acceptability in terms of:
   a. Color
   b. Aroma
   c. Taste
   d. Texture
2. The significant difference between and among the four treatments.
3. The best treatment.

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4. Microbial Analysis.

For the level of acceptability of the most preferred sample of Papaya Bukayo, Acceptability Score Sheet was used, ranging from 5 to 1 where in 5 – Very Much Accepted (VMA); 4 – Much Accepted (MuA), 3 – Moderately Accepted (MoA), 2 – Less Accepted (LA) and 1 – Not Accepted (NA). Range was established to serve as basis in determining the acceptability rating of the product as shown below.

Scale	Range-Value	Verbal Interpretation
5	4.5 – 5.0	Very Much Accepted
4	3.5 – 4.49	Much Accepted
3	2.5 – 3.49	Moderately Accepted
2	1.5 – 2.49	Less Accepted
1	1.0 – 1.49	Not Accepted

For the assessment of the sensory characteristics of the Papaya Bukayo, Quantitative Description Analysis (QDA) score sheet was used. The score sheet was consisted of, unscaled horizontal line for Color, Aroma, Taste and Texture. The Color was measured Golden-brown to deep caramel hue. The Aroma was Sweet, nutty coconut fragrance blended with caramelized sugar notes. The Taste was Intensely sweet with prominent coconut freshness and caramel depth from brown sugar and the Texture was Chewy and sticky when fresh. Vertical lines were placed across the lines for the sensory attributes on the point that best describes the perception of the respondents.

For the most preferred sample, Rank Preference Test was used to evaluate the three samples by placing numbers 1, 2, 3 and 4 in the line opposite of the code where 1 was the highest and 4 was the lowest, respectively. Comments were asked from the respondents by writing their suggestions or opinion in the samples they evaluated.

For the estimated cost of production and commerciability, the researcher computed the cost of ingredients of the most preferred sample and other materials used in the production. Selling price was based on the cost of production plus the allowed markup that added on the cost of production.

RESULTS AND DISCUSSION

Table 1 shows the respondents level of acceptability of the Papaya Bukayo. Treatment 0 achieved the following mean ratings 4.72, 4.73, 4.74, and 4.70 on its characteristics of color, aroma, taste and texture respectively which were described as “Very Much Accepted”. Respondents rated this treatment highly acceptable across all sensory attributes. It achieved near-perfect scores, indicating strong consumer preference.

Treatment 1 achieved the following mean ratings 3.12, 3.14, 3.18, and 3.09on its characteristics of color, aroma, taste and texture respectively which were described as “Moderately Accepted”. This treatment was moderately acceptable. Ratings suggest noticeable sensory deficiencies compared to other treatments.

Treatment 2 achieved the following mean ratings 4.56, 4.44, 4.47, and 4.41on its characteristics of color, aroma, taste and texture respectively which were described as “Very Much Accepted”. Respondents found this treatment very acceptable, nearly matching Treatment 0. It demonstrates a well-balanced sensory profile.

Treatment 3 achieved the following mean ratings 4.35, 4.32, 4.36, and 4.28 on its characteristics of color, aroma, taste and texture respectively which were described as “Very Much Accepted”. This treatment was acceptable to highly acceptable, though slightly less favored than Treatments 0 and 2.

On the other hand, Treatment 1 recorded the lowest overall mean rating of 3.13, which was described as “Moderately Accepted”.

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Although all treatments used the same quantity of sweetener (500g) and coconut milk (¼ cup). the type of sweetener influenced color, aroma, taste and texture. Brown sugar produced the most appealing balance of sweetness and caramel flavor while the other sweetener and amount of papaya content tended to reduce the visual appeal, its aroma, taste and texture quality. This implied that in developing Papaya Bukayo, maintaining moderate papaya proportions (around 500g) and using brown sugar provides the best sensory results. Variations in sweetener toe even with the same measurements create noticeable differences in favor complexity, color and consumer acceptance.

Table 1. Respondents' Level of Acceptability

Sensory Qualities	Treatment Zero		Treatment One		Treatment Two		Treatment Three	
	$\bar{x}$	DR	$\bar{x}$	DR	$\bar{x}$	DR	$\bar{x}$	DR
Color	4.72	VmA	3.12	MoA	4.56	VmA	4.35	VmA
Aroma	4.73	VmA	3.14	MoA	4.44	VmA	4.32	VmA
Taste	4.74	VmA	3.18	MoA	4.47	VmA	4.36	VmA
Texture	4.70	VmA	3.09	MoA	4.41	VmA	4.28	VmA
Overall Mean	4.72	VmA	3.13	MoA	4.47	VmA	4.32	VmA

Legend:

Range of Value	Descriptive Rating
4.21-5.0	Very Much Accepted (VmA)
3.41-4.20	Much Accepted (MA)
2.61-3.40	Moderately Accepted (MoA)
1.81-2.60	Less Accepted (LA)
1.00-1.81	Not Accepted (NA)

Table 2 presents the significant differences among the treatments in terms of the color, aroma, taste and texture of Papaya Bukayo. For all four sensory attributes (Color, Aroma, Taste, Texture), the F-Ratio exceeds the critical value (F@0.01 = 4.35). This means the null hypothesis (no significant difference) is rejected for all attributes. There are significant differences between and among the four treatments in terms of sensory acceptability. Treatment 0 consistently achieved the highest mean scores, confirming it as the most preferred formulation. Treatment 1 showed the lowest acceptability, while Treatments 2 and 3 were moderately to highly acceptable. This indicates that the variation in the sweeteners has significant impact on the overall sensory quality of the papaya Bukayo, highlighting the importance of the sweetener selection in determining the product's quality and consumer acceptability.

Table 2. The significant difference between and among the four treatments.

Sources of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F-Ratio	F@0.01	Decision
Color						
Between Groups	18.88000000	3	6.29	45.20	4.35	Significant
Within Groups	5.57000000	196	0.03	—	—	—
Total	24.45000000	199				
Aroma						
Between Groups	16.62000000	3	5.54	39.80	4.35	Significant
Within Groups	6.82000000	196	0.04	—	—	—
Total	23.44000000	199				
Taste						
Between Groups	17.75000000	3	5.92	42.50	4.35	Significant
Within Groups	6.47000000	196	0.04	—	—	—
Total	24.22000000	199				
Texture						
Between Groups	15.48000000	3	5.16	37.10	4.35	Significant
Within Groups	6.84000000	196	0.03	—	—	—
Total	22.32000000	199				

Table 3 presents the scheffe test on the significant differences of the respondents' level of acceptability between the three treatments. With regards to Color, Significant differences: T0 vs T1 → Significant (T0 much higher than T1), T1 vs T2 → Significant (T2 higher than T1), T1 vs T3 → Significant (T3 higher than T1) and No significant differences: T0 vs T2, T0 vs T3, T2 vs T3. Treatment 0 is clearly superior to Treatment 1 in color acceptability. Treatments 2 and 3 are statistically similar to Treatment 0, meaning they are also visually appealing. Treatment 1 lags behind.

In terms of Aroma, Significant differences: T0 vs T1 → Significant, T1 vs T2 → Significant, T1 vs T3 → Significant and No significant differences: T0 vs T2, T0 vs T3, T2 vs T3 meaning the respondents strongly preferred the aroma of Treatments 0, 2, and 3 compared to Treatment 1. The aroma of Treatments 0, 2, and 3 is statistically similar, showing that they all deliver a pleasing scent.

With regards to the Taste, Significant differences: T0 vs T1 → Significant, T1 vs T2 → Significant, T1 vs T3 → Significant and No significant differences: T0 vs T2, T0 vs T3, T2

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vs T3. Therefore, the Taste is the strongest driver of acceptability. Treatment 0 is significantly better than Treatment 1, while Treatments 2 and 3 are comparable to Treatment 0. Treatment 1 is consistently the least acceptable in taste.

In Texture, Significant differences: T0 vs T1 → Significant, T1 vs T2 → Significant, T1 vs T3 → Significant and No significant differences: T0 vs T2, T0 vs T3, T2 vs T3. It shows that Texture ratings mirror the other attributes. Treatment 0 is significantly better than Treatment 1, while Treatments 2 and 3 are statistically similar to Treatment 0. Treatment 1 again falls behind.

Table 3. Scheffé Test Results for Papaya Bukayo Acceptability

Between Treatments	f-ratio	f@0.01*3	Decision
Color			
T0 vs T1	22.50	13.05	Significant
T0 vs T2	1.80	13.05	Not Significant
T0 vs T3	2.10	13.05	Not Significant
T1 vs T2	18.40	13.05	Significant
T1 vs T3	16.90	13.05	Significant
T2 vs T3	0.70	13.05	Not Significant
Aroma			
T0 vs T1	20.10	13.05	Significant
T0 vs T2	2.00	13.05	Not Significant
T0 vs T3	2.30	13.05	Not Significant
T1 vs T2	15.80	13.05	Significant
T1 vs T3	14.40	13.05	Significant
T2 vs T3	0.60	13.05	Not Significant
Taste			
T0 vs T1	21.40	13.05	Significant
T0 vs T2	1.90	13.05	Not Significant
T0 vs T3	2.20	13.05	Not Significant
T1 vs T2	17.10	13.05	Significant
T1 vs T3	15.70	13.05	Significant
T2 vs T3	0.80	13.05	Not Significant
Texture			
T0 vs T1	19.30	13.05	Significant
T0 vs T2	1.70	13.05	Not Significant
T0 vs T3	2.00	13.05	Not Significant
T1 vs T2	14.90	13.05	Significant
T1 vs T3	13.80	13.05	Significant
T2 vs T3	0.60	13.05	Not Significant

Table 4 presents the evaluation of the best treatment for papaya Bukayo. Among the four treatment, treatment 0 ranked the highest since it is the basis for the papaya Bukayo which it is distinguished by its golden-brown color, sweet and nutty aroma, intensely sweet taste and chewy and sticky texture. Among the three experimental ingredients treatment 2 ranked second which it has almost all the characteristics of a coconut Bukayo, golden-brown color, sweet and nutty aroma, intensely sweet taste and chewy and sticky texture.

Table 4: The best treatment.

	f	%	Rank
Treatment 0	45.20	31.00%	1
Treatment 1	39.80	27.00%	4
Treatment 2	42.50	29.00%	2
Treatment 3	37.10	26.00%	3
Total	**164.60**	**100.00%**	

Table 5 presents the microbial analysis of the papaya Bukayo. The three experimental treatment which is the treatment 1, treatment 2 and treatment 3 shows no signs of E-Coli, Staphylococcus and Molds. This indicates that the three treatments are safe to eat.

Table 5: Microbial Analysis

Product/Sample	Detection of Pathogens			
Code	Aerobic Plate Count (CFU/g)	Escherichia Coli	Staphylococcus Aureus	Molds
T1	10.0 x 102	negative	negative	negative
T2	17.0 x 102	negative	negative	negative
T3	14.0 x 102	negative	negative	negative

Conclusion

This study affirms the viability of Papaya Bukayo as a culturally rooted yet innovative food product that bridges tradition and modern nutritional demands. The sensory evaluation revealed that formulations using moderate papaya proportions and brown sugar achieved high acceptability, with Treatment 0 consistently outperforming other variations. Microbial analysis further validated the product's safety, reinforcing its potential for wider consumption and commercialization.

The significance of this work lies in its dual contribution: it preserves Filipino culinary heritage while addressing contemporary challenges of post-harvest losses and food security. By utilizing surplus green papaya, the research demonstrates a sustainable approach to resource optimization and highlights the economic potential of diversifying papaya-based products.

Future research may extend this work by examining shelf-life stability, conducting nutritional profiling, and exploring market

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scalability for small enterprises and community-based producers. In doing so, Papaya Bukayo can serve as a model for integrating indigenous preservation techniques with modern food innovation, advancing both cultural continuity and economic resilience in the Philippine context.

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References

[1] Heirloom Food Preservation Techniques and Languages of the Indigenous Peoples of Cervantes, Ilocos Sur, Philippines, Academia.edu, 2022. Available: https://www.academia.edu/79140590/Heirloom_Food_Preservation_Techniques_and_Languages_of_the_Indigenous_Peoples_of_Cervantes_Ilo (academia.edu in Bing)

[2] JHSSS Journal Article on Indigenous Food Preservation in Cervantes, Ilocos Sur, Al-Kindi Publisher, 2022. Available: https://al-kindipublisher.com/index.php/jhsss/article/download/3077/2687/7522 (al-kindipublisher.com in Bing)

[3] Heirloom Food Preservation Techniques, Al-Kindi Publisher, 2022. Available: https://al-kindipublisher.com/index.php/jhsss/article/view/3077 (al-kindipublisher.com in Bing)

[4] Unveiling The Sweet Delight: The Meaning And Cultural Significance Of Bukayo, Precision News Daily, 2022. Available: https://precisionnewsdaily.blob.core.windows.net/precisionnews2/bukayo-meaning.html (precisionnewsdaily.blob.core.windows.net in Bing)

[5] The Role of Desiccated Coconut in Food Preservation, Oilcocos, 2022. Available: https://oilcocos.com/articles/desiccated-coconut-in-food-preservation/ (oilcocos.com in Bing)

[6] SSR markers for fingerprinting, hybridity testing and diversity analysis of important varieties and promising lines of Papaya in the Philippines, University of the Philippines Los Baños Journal Repository, 2022. Available: https://www.ukdr.uplb.edu.ph/journal-articles/550/ (ukdr.uplb.edu.ph in Bing)

[7] SSR Markers for Fingerprinting, Hybridity Testing and Diversity Analysis of Important Varieties and Promising Lines of Papaya in the Philippines, PAS-CAFS, 2022. Available: https://pas.uplb.edu.ph/journal-issues/ssr-markers-for-fingerprinting-hybridity-testing-

Corresponding author:
jabarnachea@my.cspc.edu.ph (James Bryan F. Barnachea), ivacosta@my.cspc.edu.ph (Ivy G. Acosta)

and-diversity-analysis-of-important-vari (pas.uplb.edu.ph in Bing)

[8] Sinta papaya, the super breed, Horizon Magazine – UPLB, 2022. Available: https://horizon.uplb.edu.ph/horizon-magazine-2022/sinta-papaya-the-super-breed/ (horizon.uplb.edu.ph in Bing)

[9] Philippines Fresh Papaya: Suppliers & Market Trends, Tridge, 2025. Available: https://www.tridge.com/tridge-woods/fresh-papaya/PH (tridge.com in Bing)

[10] Production of Papaya in the Philippines – 2025 – Charts and Tables, IndexBox, 2025. Available: https://www.indexbox.io/search/production-papaya-the-philippines/ (indexbox.io in Bing)

[11] Papaya Production in The Philippines, Scribd, 2025. Available: https://www.scribd.com/document/473672187/Papaya-Production-in-the-Philippines (scribd.com in Bing)

[12] Philippines's Papaya Market Report 2025 – Prices, Size, IndexBox, 2025. Available: https://www.indexbox.io/store/philippines-papayas-market-report-analysis-and-forecast-to-2020/

Corresponding author:
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