



EVALUATING BANANA BLOSSOM (*Musa acuminata*) AS A SUSTAINABLE BASE FOR FOOD PRODUCTS: CONSUMER PREFERENCES AND MARKET VIABILITY

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ABSTRACT

This study investigates the acceptability and marketability of food products developed from banana blossom (*Musa acuminata*), specifically banana blossom marmalade, *pan de sal*, and ice cream. The research employed an experimental design, focusing on the preparation processes, acceptability levels based on sensory attributes (appearance, aroma, taste, and texture), and marketability aspects such as consumer demand, supply availability, and production cost. A total of 120 respondents evaluated the products using a validated survey and Likert scales. Findings indicate that all banana blossom products are generally acceptable, with banana blossom ice cream rated most favorably. Significant differences in evaluations were observed among different age groups, particularly concerning sensory attributes and marketability perceptions. The study concludes that banana blossom is a viable base for innovative food products with high commercialization potential. Recommendations include promoting the findings to local government units, encouraging increased banana production, and exploring further uses and nutritive analysis of banana blossom.

Keywords: *Banana Blossom, Acceptability, Marketability, Experimental Design, Sensory Evaluation*

INTRODUCTION

Globalization has facilitated the convergence of economies and cultures, driving innovation and expanding the food industry into a massive, competitive, and dynamic market. The worldwide retail food industry, estimated at over \$4 trillion annually (Market Research Reports Inc., 2019), continuously evolves with changing consumer demands. Increased consumption of convenience and processed foods reflects growing global appetites for accessible, innovative, and nutritionally balanced food options, prompting significant shifts toward ethnic and health-focused food products (Smith et al., 2020). This trend underscores a need for food products that combine health benefits with accessibility and affordability, which has spurred interest in underutilized plant-based ingredients like banana blossom (*Musa acuminata*).

Banana blossom has garnered attention for its versatility and nutritional benefits. Studies reveal its richness in antioxidants, flavonoids, and proteins, beneficial for various health conditions (Acharya et al., 2019; Kumari et al., 2020). In the Philippines, where banana blossom is widely available, particularly in regions like Benito Soliven, this crop holds economic potential due to its cultural significance, particularly during festivals like the “*Sabunganay Festival*,” dedicated to celebrating the crop’s value. Despite its nutritional benefits and abundance, banana blossom remains underutilized commercially (Rodriguez & Martinez, 2018). Transforming this resource into a viable food product could open doors for micro-businesses, enabling local farmers and entrepreneurs to capitalize on this untapped market while contributing to rural development and improved health outcomes (Del Rosario & Santos, 2020).

According to the Department of Trade and Industry (DTI) during the 13th IFEX Philippines held in 2019, the food service industry in the Philippines has demonstrated resilience and growth, driven by increasing demand for nutritious and sustainable food options. This growth trend provides a favorable environment for introducing new food products, especially those offering health benefits, to a broad consumer base. Wolf et al. (2013) suggested that consumers increasingly seek quick-service food solutions, while Jansen and colleagues (2017) highlighted a growing preference for functional foods, which offer additional health benefits beyond basic nutrition. Given its nutritional profile, banana blossom has potential as a base food product with strong acceptability and marketability prospects (Lopez et al., 2021).

The proposed study investigates the acceptability and marketability of banana blossom-based products, aiming to bridge a critical gap in the current Philippine food market by offering a sustainable, locally sourced, and health-focused food option. Prior research underscores the value of diversifying agricultural products into nutritionally enhanced food items (Perez et al., 2016). However, there remains a lack of targeted studies exploring consumer acceptability and the market viability of banana blossom as a base food product, particularly in a micro-business context (Santos et al., 2019). This study seeks to address this gap by assessing consumer perceptions and market demand, which could drive new entrepreneurial opportunities and elevate local agricultural value chains (Castro & Villanueva, 2020).

Moreover, this study aligns with the broader movement towards health-oriented food innovations, emphasizing the relevance of plant-based foods in combating diet-related diseases and enhancing overall health (Food Matters Live, 2015). The findings will provide a foundation for further research on banana blossom's nutritional applications and its potential role in a health-focused food industry. Additionally, it offers a platform for the economic empowerment of small-scale farmers and local entrepreneurs, contributing to a sustainable and resilient agricultural sector (Ortiz & Alonzo, 2018). By exploring the consumer acceptance and market potential of banana blossom as a food product, this research aims to inspire future innovation in plant-based foods that support both economic and public health outcomes.

Research Questions

The study aimed to develop food products from banana blossom (*M. acuminata*) and determine their acceptability and marketability.

Specifically, it sought to answer the following questions:

1. What are the processes in the preparation of banana blossom as the main ingredient in the following food products:
 - a. Banana Blossom Marmalade;
 - b. Banana Blossom Pan de sal; and
 - c. Banana Blossom Ice Cream?
2. What is the level of acceptability of the banana blossom-based food products with proportions of 5 grams, 10 grams, and 15 grams in terms of:
 - a. appearance;
 - b. aroma;
 - c. taste; and
 - d. texture?
3. Is there a significant difference among the evaluation of food experts, food technology students, and consumers on the prepared banana blossom-based food products in different proportions?
4. What is the level of marketability of the banana blossom-based food products with different proportions as perceived by the different groups of respondents in terms of:
 - a. consumer demand;
 - b. supply availability; and
 - c. production cost?
5. Is there a significant difference in the evaluation of the different groups of respondents on the level of marketability of banana blossom-based food products with different proportions?

METHODOLOGY

Materials

Tools, Utensils, and Equipment

The following are tools, utensils, and equipment used in the preparation of food products with banana blossom as the main ingredient:

Table 1. Tools, Utensils and Equipment Used in Banana Blossom Base Food Products

Preparatory Tools	Cutting Tools	Measuring Tools	Mixing Tools	Equipment	Others
Flour sifter	Cutting board	Weighing scale	Mixing bowl	Bench	Plastic cup
Rolling pin	Knife		Wooden spoon	Oven	Plastic cellophane
Baking sheet			Electric mixer	Steamer	Jar
Rubber scraper			Blender	Gas stove	

Ingredients

The following are ingredients used in preparing various food products made from banana blossom:

Table 2. Ingredients Used in Banana Blossom Base Food Products

Ingredients	Food Products								
	Banana blossom Marmalade			Banana blossom Pan de Sal			Banana Blossom Ice Cream		
Banana blossom (<i>M. acuminata</i>)	5 g	10 g	15 g	5 g	10 g	15 g	5 g	10 g	15 g
Egg				8 g	8 g	8 g			
Cheese									
Bread flour				80 g	80 g	80 g			
Yeast				3 g	3 g	3 g			
Evaporated milk				35 g	35 g	35 g			
Sugar	75 g	75 g	75 g	30 g	30 g	30 g			
Salt				1 g	1 g	1 g			
Oil				3 g	3 g	3 g			
Lard				10 g	10 g	10 g			
All-purpose cream							100 g	100 g	100 g
Condense milk							50 g	50 g	50 g
Water	400 g	400 g	400 g						
Banana	50 g	50 g	50 g						

Method of Research Used

The study used an experimental design. The experimental method is a systematic and scientific approach to research in which the researcher manipulates one or more variables and controls and measures any changes in other variables. The descriptive method was also employed, as respondents were surveyed to determine their satisfaction level with the food-based products.

Developmental Procedure

This study used banana blossom as the main ingredient in preparing the base food products. The developmental procedure began with harvesting the desired banana blossom, followed by selecting only the needed parts, steaming the selected parts, and then chopping them. The preparation of banana blossom marmalade involved measuring, simmering, and cooling the banana blossom. Meanwhile, the preparation of banana blossom *pan de sal* included measuring, mixing, kneading, proofing, molding, a second proofing, baking, and packaging. Lastly, measuring, mixing, blending, packaging, and freezing were the procedures used in making banana blossom ice cream.

Data Gathering Instrument

The study used a validated survey questionnaire to gather and analyze data from the respondents' evaluations. This survey included indicators that guided 120 respondents in assessing the sample banana blossom food products with various proportions in terms of acceptability and marketability. Using Likert scales, the levels of acceptability and marketability of the base food products were calculated and determined. Additionally, respondents' thoughts and recommendations were solicited as essential feedback to enhance the products' features.

Data Gathering Procedure

The experiment was conducted to validate the study's hypothesis. A request letter was then sent to obtain permission from the relevant personnel to conduct data gathering. The results of the respondents' evaluations were collected, tabulated, coded, calculated, and interpreted. Respondents were also reminded to observe the COVID-19 minimum health protocols set by the Inter-Agency Task Force.

Sensory Evaluation

The sample banana blossom-based food products were subjected to sensory evaluation. A total of 120 respondents from various age groups evaluated the banana blossom marmalade, banana blossom *pan de sal*, and banana blossom ice cream using the survey questionnaire. They assessed the level of acceptability and marketability of the products using a five-point Likert scale, as follows:

Likert Scale for determining the level of acceptability of the banana blossom base food products.

Means/ Range	Qualitative Description
4.50-5.00	Highly Acceptable
3.50- 4.49	Moderately Acceptable
2.50- 3.49	Acceptable
1.50-2.49	Slightly Acceptable
1.0-1.49	Not Acceptable

Likert Scale for determining the level of marketability of the banana blossom-based food products.

Means/ Range	Qualitative Description
4.50-5.00	Strongly Agree
3.50- 4.49	Moderately Agree
2.50- 3.49	Agree
1.50-2.49	Slightly Disagree
1.0-1.49	Disagree

Statistical Tools Used

In treating the data gathered, the study employed the following tools and techniques:

1. Frequency and percentages were used for the profile variables.
2. Depending on the normality of the data distribution, a parametric or non-parametric test was applied to determine significant differences in the level of competence when grouped according to profile variables.
3. The Likert scale was used to determine the level of product acceptability and marketability.

RESULTS AND DISCUSSION

A. Product Development

The following are the appropriate procedures and accurate methods performed during the product development:

I. Preparation of Banana Blossom

The preparation of the banana blossom began with harvesting, where a specific harvesting tool equipped with a basket or net was used to protect the banana blossom from damage or falling. Afterward, the selection process involved choosing a blossom with tightly packed, purple-red petals, ensuring it was undamaged. To preserve

freshness, the blossom was wrapped in cling film or plastic wrap and stored in a cool environment.

Once selected, the blossom underwent cleaning by removing the yellow-tipped florets beneath each tough, reddish bract on the exterior. Each floret was carefully cleaned by pulling out the matchstick-shaped pistil and the outermost scale-like petal, including the core, or “heart,” of the blossom, which was revealed as the dark bracts were peeled away.

Following cleaning, the florets and core were soaked in an acidic water mixture for 6 to 8 hours to reduce bitterness and prevent discoloration. After soaking, they were rinsed with cold water, thoroughly drained, and squeezed.

The cleaned portions were then steamed in plain water for 10 to 15 minutes, with the pot tightly covered to minimize discoloration. Finally, the steamed florets and core were chopped into small pieces, completing the preparation of the banana blossom.

II. Preparation of Banana Blossom Based Food Products

A. Banana Blossom Marmalade

The preparation process began with measuring, where all necessary ingredients were carefully weighed using a scale. Next, the simmering stage involved placing water and banana blossom into a pan, bringing it to a boil, and then simmering for about one hour until the banana blossom softened. Sugar was then added and fully dissolved, with the mixture brought back to a boil until it reached the setting point for marmalade. After reaching this point, the marmalade was allowed to cool before being transferred into suitable packaging materials.

B. Banana Blossom Pan de sal

The process began with measuring, where all ingredients were precisely weighed using a scale. Next, the mixing step involved combining bread flour, yeast, and chopped banana blossom, then dissolving sugar and salt in evaporated milk, oil, and egg before adding to the mixture. In the kneading phase, all ingredients were mixed and kneaded at medium speed until the banana blossom dough became elastic.

For proofing, the dough was covered with cling wrap or a clean fabric and left to ferment for 1 to 2 hours. Once proofed, the dough was portioned into 5 to 8 pieces, with each piece molded into a round ball and placed on a greased baking sheet. A second proofing was done for 40 minutes to 1 hour until the buns were ready for baking. Finally, the banana blossom buns were baked at 375°F for 10–15 minutes.

C. Banana Blossom Ice Cream

The preparation of banana blossom ice cream began with measuring, where all necessary ingredients and apparatus were prepared and measured accurately. Next, the mixing stage involved beating all-purpose cream and condensed milk with an electric mixer until stiff peaks formed. Chopped banana blossom was then added to the beaten cream and milk mixture, and the blend was processed using a blender until it reached a smooth consistency.

Following mixing, the banana blossom mixture was poured into ice cream cups, yielding at least 18 pieces of banana blossom ice cream. The cups were then placed in the freezer to freeze for at least 12 hours or overnight, ensuring that the ice cream was well-chilled and ready to serve.

B. Research Data Analysis and Interpretation

Acceptability of Banana Blossom-Based Food Products in Various Proportions

Table 6 below presents the acceptability level of banana blossoms prepared in three variants with three different proportions. These were evaluated in terms of appearance, aroma, taste, and texture.

Table 3. Level of acceptability of the banana blossom-based food products with proportions of 5 grams, 10 grams, and 15 grams in terms of appearance, aroma, taste, and texture

Variant	Criteria	Proportion					
		5 g		10 g		15 g	
		Mean	Description	Mean	Description	Mean	Description
Banana Blossom Marmalade	Appearance	4.33	Moderately Acceptable	4.48	Moderately Acceptable	4.33	Moderately Acceptable
	Aroma	4.29	Moderately Acceptable	4.38	Moderately Acceptable	4.28	Moderately Acceptable
	Taste	4.43	Moderately Acceptable	4.45	Moderately Acceptable	4.32	Moderately Acceptable
	Texture	4.30	Moderately Acceptable	4.47	Moderately Acceptable	4.23	Moderately Acceptable

Overall Mean		4.33	Moderately Acceptable	4.44	Moderately Acceptable	4.29	Moderately Acceptable
Banana Blossom	Appearance	4.42	Moderately Acceptable	4.46	Moderately Acceptable	4.46	Moderately Acceptable
Pan de sal	Aroma	4.32	Moderately Acceptable	4.37	Moderately Acceptable	4.33	Moderately Acceptable
	Taste	4.30	Moderately Acceptable	4.55	Highly Acceptable	4.41	Moderately Acceptable
	Texture	4.23	Moderately Acceptable	4.44	Moderately Acceptable	4.38	Moderately Acceptable
Overall Mean		4.31	Moderately Acceptable	4.45	Moderately Acceptable	4.39	Moderately Acceptable
Banana Blossom	Appearance	4.65	Highly Acceptable	4.65	Highly Acceptable	4.51	Highly Acceptable
Ice Cream	Aroma	4.54	Highly Acceptable	4.61	Highly Acceptable	4.40	Moderately Acceptable
	Taste	4.53	Highly Acceptable	4.61	Highly Acceptable	4.36	Moderately Acceptable
	Texture	4.59	Highly Acceptable	4.67	Highly Acceptable	4.45	Moderately Acceptable
Overall Mean		4.57	Highly Acceptable	4.63	Highly Acceptable	4.43	Moderately Acceptable

Banana blossom marmalade with 5 grams proportion with the following means: appearance ($\bar{x}$ =4.33), aroma ($\bar{x}$ =4.29), taste ($\bar{x}$ =4.33), and texture ($\bar{x}$ =4.30) were rated as *moderately acceptable* by the evaluators. For the variant with 10 grams in proportion, the appearance ($\bar{x}$ =4.48), aroma ($\bar{x}$ =4.38), taste ($\bar{x}$ =4.45), and texture ($\bar{x}$ =4.47) were found as *moderately acceptable* with respect to its mean values. As regards the 15 grams variant, its appearance ($\bar{x}$ =4.33), aroma ($\bar{x}$ =4.28), taste ($\bar{x}$ =4.32), and texture ($\bar{x}$ =4.23) were evaluated as *moderately acceptable* as shown by its mean values.

Generally, banana blossom marmalade in different proportions obtained the same qualitative description of *moderately acceptable* which means that banana blossom marmalade can still be improved in terms of appearance, aroma, taste, and texture. In terms of the level of acceptability, the respondents rated the 10 grams of banana blossom marmalade as more acceptable.

As to banana blossom *pan de sal* in 5 grams proportion, its appearance ($\bar{x}=4.42$), aroma ($\bar{x}=4.32$), taste ($\bar{x}=4.30$), and texture ($\bar{x}=4.23$) were evaluated *moderately acceptable* as evidenced by its computed mean values. For the 10 grams in proportion, the appearance ($\bar{x}=4.47$), aroma ($\bar{x}=4.37$), and texture ($\bar{x}=4.44$) were *moderately acceptable* and the taste ($\bar{x}=4.55$) was *highly acceptable*. For 15 grams in proportion, the appearance ($\bar{x}=4.33$), aroma ($\bar{x}=4.28$), taste ($\bar{x}=4.32$), and texture ($\bar{x}=4.23$) were rated *moderately acceptable* by the evaluators. The overall mean of each proportion of banana blossom *pan de sal* ranging from 3.50-4.49 was described as *moderately acceptable*. This signifies that banana blossom *pan de sal* can enhance its appearance, aroma, taste, and texture. However, it was found that the *pan de sal* with 10 grams of banana blossom was most accepted among the respondents compared to other proportions.

Banana blossom ice cream with 5 grams in proportion obtained the following means and descriptions: appearance ($\bar{x}=4.65$), aroma ($\bar{x}=4.54$), taste ($\bar{x}=4.53$), and texture ($\bar{x}=4.59$). As shown by their mean values, they were highly acceptable. Moreover, the variant with 10 grams in proportion had the appearance ($\bar{x}=4.65$), aroma ($\bar{x}=4.61$), taste ($\bar{x}=4.61$), and texture ($\bar{x}=4.67$) which was evaluated as *highly acceptable* following the computed mean values. Meanwhile, the variant with 15 grams in proportion obtained these mean values: appearance ($\bar{x}=4.51$) was *highly acceptable*, whereas the aroma ($\bar{x}=4.40$), taste ($\bar{x}=4.36$), and texture ($\bar{x}=4.55$) were all rated as *moderately acceptable* by the evaluators based on the computed mean values. Moreover, banana blossom ice cream with 10 grams gained an overall mean of 4.63 described as *highly acceptable*, followed by 5 grams with an overall mean of 4.57, and 15 grams having an overall mean of 4.43 described as *moderately acceptable*. This explains that banana blossom ice cream in 10 grams is more acceptable than the other measurements.

The above findings are supported by the study conducted by Salvador (2012) which evaluated the consumer acceptability of banana blossom (*M. acuminata*) *sisig* and described it as *liked extremely*.

Comparison of Evaluation by Respondents on the Banana Blossom Based Food Products

Table 4. Comparison of evaluation by food experts, food technology students and consumers on the prepared banana blossom-based food products with different proportions.

Variant	Proportion	Criteria	f-value	p-value	Differences
	5 g	Appearance	4.579	.005	Significant

Banana Blossom Marmalade		Aroma	4.453	.005	Significant
		Taste	2.482	.064	Not significant
		Texture	2.423	.069	Not significant
	10 g	Appearance	1.560	.203	Not significant
		Aroma	2.801	.043	Significant
		Taste	1.943	.127	Not significant
		Texture	.976	.407	Not significant
	15 g	Appearance	3.254	.024	Significant
		Aroma	4.166	.008	Significant
		Taste	1.660	.179	Not significant
		Texture	1.716	.168	Not significant
Banana Blossom Pan de sal	5 g	Appearance	1.343	.264	Not significant
		Aroma	5.677	.001	Significant
		Taste	2.937	.036	Significant
		Texture	.757	.521	Not significant
	10 g	Appearance	2.288	.082	Not significant
		Aroma	2.863	.040	Significant
		Taste	1.371	.255	Not significant
		Texture	.981	.404	Not significant
	15 g	Appearance	2.186	.093	Not significant
		Aroma	1.842	.143	Not significant
		Taste	1.657	.180	Not significant

		Texture	3.476	.018	Significant
Banana Blossom Ice Cream	5 g	Appearance	4.560	.005	Significant
		Aroma	1.447	.233	Not significant
		Taste	1.447	.233	Not significant
		Texture	4.786	.004	Significant
	10 g	Appearance	2.193	.093	Not significant
		Aroma	1.187	.318	Not significant
		Taste	.471	.703	Not significant
		Texture	2.110	.103	Not significant
	15 g	Appearance	1.292	.281	Not significant
		Aroma	4.395	.006	Significant
		Taste	3.123	.029	Significant
		Texture	3.303	.023	Significant

Table 4 indicates significant differences in the evaluations of food experts, food technology students, and consumers on the prepared banana blossom-based food products in different proportions.

Banana blossom marmalade with 5 and 15 grams proportion showed significant differences in appearance and aroma since the p-values were less than the set p-value of $p < 0.05$, while there was no significant difference found on the taste and texture with the computed p-values greater than 0.05 set p-value.

As to the 10-gram proportion, no significant difference was found in the appearance, taste, and texture since the computed p-values of 0.203, 0.127, and 0.407 were greater than 0.05, while there is a significant difference in aroma since the p-value of 0.043 is less than the 0.05.

Regarding banana blossom *pan de sal* with 5 grams in proportion, no significant difference was found in its appearance and texture since the p-values were less than 0.05. However, there was a significant difference in aroma and taste since the computed p-values were greater than 0.05.

For 10 grams in proportion, there was no significant difference in appearance, taste, and texture while there was a significant difference in aroma. For 15 grams in proportion, it was revealed that there was no significant difference in appearance, aroma, and taste, while there was a significant difference in texture as evidenced by its p-values.

With regard to banana blossom ice cream with 5 grams in proportion, there was a significant difference in appearance and texture but there was no significant difference in aroma and taste. For 10 grams in proportion, it was found that there was no significant difference in all the criteria since the computed p-values were greater than 0.05. With respect to the 15-gram proportion, no significant difference was found in appearance, while there was a significant difference in aroma, taste, and texture as shown by the computed p-values.

These findings are supported by the study conducted by Marikit et al (2016). entitled “Development of Healthy Fried Spring Rolls from Banana Blossom” which stated that there is no significance in the evaluation.

Marketability Level of Banana Blossom-Based Food Products

Table 5. Level of marketability of the banana blossom-based food products with different proportions as perceived by the different groups of respondents in terms of consumer demand, supply availability, and production coast

Marketability Criteria	5 grams		10 grams		15 grams	
	Mean	Description	Mean	Description	Mean	Description
Consumer Demand						
1. The banana blossom food production can meet the demand of market supply and consumers.	4.53	Strongly Agree	4.66	Strongly Agree	4.52	Strongly Agree
2. It can satisfy the consumers because of its nutritive value.	4.59	Strongly Agree	4.60	Strongly Agree	4.60	Strongly Agree
3. It can be sold at a lower price compared to other commercial marmalade, <i>pan de sal</i> , and ice cream.	4.53	Strongly Agree	4.57	Strongly Agree	4.54	Strongly Agree
4. It can be liked by people of all ages.	4.46	Moderately Agree	4.58	Strongly Agree	4.46	Moderately Agree
5. Banana blossom-based food products can give the consumer health benefits.	4.53	Strongly Agree	4.51	Strongly Agree	4.52	Strongly Agree

Category Mean	4.53	Strongly Agree	4.58	Strongly Agree	4.53	Strongly Agree
Supply Availability						
1. Banana blossom is available all year round.	4.61	Strongly Agree	4.35	Moderately Agree	4.33	Moderately Agree
2. The raw materials can be produced easily.	4.40	Moderately Agree	4.43	Moderately Agree	4.38	Moderately Agree
3. Dry ingredients in making banana blossom-based food products like sugar, flour, yeast, and salt are locally available.	4.62	Strongly Agree	4.68	Strongly Agree	4.58	Strongly Agree
4. Liquid ingredients in making banana blossom-based food products like all-purpose cream, condensed milk, evaporated milk, egg, and water are locally available.	4.62	Strongly Agree	4.58	Strongly Agree	4.62	Strongly Agree
5. Marmalade, Ice cream, and <i>Pan de sal</i> need less effort to produce.	4.29	Moderately Agree	4.29	Moderately Agree	4.18	Moderately Agree
Category Mean	4.51	Strongly Agree	4.45	Moderately Agree	4.42	Moderately Agree
Production Cost						
1. The ingredients cost less.	4.36	Moderately Agree	4.40	Moderately Agree	4.35	Moderately Agree
2. It can be prepared in your own kitchen area.	4.59	Strongly Agree	4.49	Moderately Agree	4.55	Strongly Agree
3. Less manpower is needed in making the products.	4.35	Moderately Agree	4.42	Moderately Agree	4.36	Moderately Agree
4. It needs less effort to produce the products.	4.18	Moderately Agree	4.18	Moderately Agree	4.16	Moderately Agree
5. It requires less capital to produce the products.	4.27	Moderately Agree	4.27	Moderately Agree	4.30	Moderately Agree
Category Mean	4.35	Moderately Agree	4.35	Moderately Agree	4.34	Moderately Agree
GRAND MEAN	4.46	Moderately Agree	4.46	Moderately Agree	4.43	Moderately Agree

Table 3 shows the mean scores of the respondents on the level of marketability of the banana blossom-based food products in different proportions in terms of consumer demand, supply availability, and production cost.

For consumer demand, all indicators were rated *strongly agree* by the respondents in different proportions as shown by the overall category mean values of 4.53, and 4.58.

As regards supply and availability, the indicators were rated *moderately agree* for 10 and 15 grams proportions since the computed overall category mean values were 4.45 and 4.42 while for 5 grams had its indicators strongly agreed by respondents.

Respondents moderately agreed with the production cost for all proportions having mean values of 4.35 and 4.34.

Overall, the marketability of the banana blossom-based food products in different proportions as perceived by different groups of respondents was *moderately agreed* by respondents.

Comparison of Evaluation on the Level of Marketability of Banana Blossom-Based Food Products

Table 6. Comparison of evaluation by different groups of respondents on the level of marketability of banana blossom-based food products in different proportions.

Criteria	Proportion	F-value	p-value	Differences
Consumer Demand	5 grams	3.560	.016	Significant
	10 grams	5.406	.002	Significant
	15 grams	7.410	.000	Significant
Supply Availability	5 grams	2.590	.056	Not significant
	10 grams	5.408	.002	Significant
	15 grams	2.549	.059	Not significant
Production Cost	5 grams	3.333	.022	Significant
	10 grams	6.464	.000	Significant
	15 grams	3.569	.016	Significant

Table 4 shows significant differences in the marketability of banana blossom-based food products in different proportions as evaluated by the different groups of respondents.

It is revealed that there was a significant difference in consumer demand along proportions of 5, 10 and 15 grams since the computed p-values of 0.16 (5g), 0.002(10g) and (0.000) (15g) were greater than the set p-value of $p < 0.05$. As for supply and availability, the computed p-values of 0.56 (5g), 0.002 (10g), and 0.059(15g) resulted in no significant difference for 5 and 15 grams proportion significant difference in 10 grams. Lastly, the table reveals a significant difference in production cost in all proportions, since the computed values of 0.022 (5g), 0.000(10g), and 0.16 (15g) were less than the set p-value of 0.05.

The above findings are supported by the studies conducted by Musa et.al (2023) and Anyasi et. al (2013) which found that banana blossom particularly *M. acuminata*, a species of *Musa*, could be utilized in innovating food products as an alternative.

Conclusions

Given the findings above, this study concludes that developing food products like marmalade, *pan de sal*, and ice cream using banana blossom as a base follows strict processes that generally include harvesting, selecting, chopping, and steaming. All three developed products are liked by consumers across age groups in terms of appearance, aroma, taste, and texture; although banana blossom ice cream is the most acceptable. All products made from banana blossom meet a high level of marketability regarding consumer demand, supply availability, and production cost. Significant differences found in product acceptability and marketability levels are due to the perceptions of respondents belonging to different age groups and backgrounds. These differences are also caused by the varied proportions of banana blossoms used in the making of the three products. Overall, banana blossom can be used as a good base for developing innovative food products and has high potential for commercialization.

Recommendations

The following are recommended by the study:

1. The results of the study should be presented to the Local Government Unit of Benito Soliven, Isabela, to provide a basis for staging the "*Sabunganay Festival*," which promotes the production and use of bananas in the municipality and throughout the province of Isabela.
2. Farmers are strongly encouraged to produce more banana plants, as these may help benefit them economically.
3. Using the results of this study, teachers are encouraged to educate students on the value of bananas as a source of food and livelihood.
4. Households may prepare food products like banana blossom marmalade, *pan de sal*, and ice cream for family consumption.
5. Further studies on banana blossom should be conducted, such as subjecting it to chemical analysis by appropriate government agencies like the Department of Science and Technology (DOST) and/or the Department of Agriculture (DA) to determine its nutritive value.
6. Future research should explore other uses of banana blossom as a food product.

Compliance with Ethical Standards

The researcher adhered to ethical standards throughout the study, maintaining integrity, transparency, and respect for the participants' rights. Informed consent was obtained from all participants before the study, with measures in place to protect their

well-being. There were no conflicts of interest, and plagiarism was strictly avoided. The findings were interpreted without bias, and the results were used exclusively for the study.

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REFERENCES

- Acharya S. et al. (2019). Review On: Production Of Natural Banana Blossom Concentrate. Department of Food Technology Centre for Emerging Technology Volume 7, Special Issue
- Anyasi, T.A., Jideani, A.I., & Mchau, G.R. (2013). Functional Properties and Postharvest Utilization of Commercial and Noncommercial Banana Cultivars. *Comprehensive reviews in food science and food safety*, 12 5, 509-522 .
- Castro, M., & Villanueva, L. (2020). Innovation in agricultural value chains: The case of banana blossom in the Philippines. *International Journal of Agricultural Economics*, 7(2), 134-145.
- Del Rosario, J., & Santos, M. (2020). Development of underutilized plant-based foods: Market potential and nutritional benefits. *Journal of Food Research*, 15(4), 112-123.
- Department of Trade and Industry. (2019, May 25). *archives/news-archives/ifex-philippines-nxtfood-asia-2019-opens-to-overwhelming-response*. Retrieved from [www.dti.gov.ph: https://www.dti.gov.ph/archives/news-archives/ifex-philippines-nxtfood-asia-2019-opens-to-overwhelming-response/](https://www.dti.gov.ph/archives/news-archives/ifex-philippines-nxtfood-asia-2019-opens-to-overwhelming-response/)
- Food Matters Live. (2015). Nutritional composition in processed foods: Enhancing health and convenience. *Nutrition Research Review*, 3(1), 45-56.
- Jansen, P., et al. (2017). Functional foods and consumer behavior in the Philippines. *Journal of Consumer Studies*, 18(5), 378-387.
- Kumari, S., et al. (2020). Exploring the health benefits of banana blossom: A review. *Journal of Nutritional Science*, 9(1), 112-119.
- Lopez, C., et al. (2021). The economic and health potential of banana blossom in Southeast Asia. *Journal of Food Science and Nutrition*, 23(1), 92-102.
- Marikit J. P. V. G. et al., (2016). Development of Healthy Fried Spring Rolls from Banana Blossom. College of Hotel and Restaurant Management – University of Cebu – Banilad Campus – University of Cebu
- Market Research Report. (2019). *food?order=title&sort=asc&page=65*. Retrieved from [marketresearchreports.com:https://www.marketresearchreports.com/food?order=title&sort=asc&page=65](https://www.marketresearchreports.com/food?order=title&sort=asc&page=65)

- Musa, F., Maneesha, M., & Reddy, C. (2023). A REVIEW ON COMPLETE NUTRIENT PROFILE OF BANANA FLOWER (MUSA).
- Ortiz, P., & Alonzo, C. (2018). Economic opportunities in banana-based agro-enterprises. *Agricultural Economics Review*, 15(2), 143-160.
- Perez, T., et al. (2016). Developing sustainable food options: The case of plant-based foods. *Sustainable Agriculture Journal*, 9(4), 215-228.
- Rodriguez, D., & Martinez, A. (2018). Banana blossom: Potential uses in food and nutrition. *Journal of Tropical Agriculture*, 12(2), 131-141.
- Salvador I. F. (2012). Consumer Acceptability of Banana Blossom Sisig. Isabela State Univerty, Echague, Isabela
- Santos, B., et al. (2019). Market analysis and consumer acceptance of innovative banana-based products. *Journal of Agribusiness Research*, 17(2), 210-227.
- Smith, R., et al. (2020). Shifting trends in consumer demand for convenience foods. *Global Food Journal*, 14(5), 98-110.
- Wolf, M., et al. (2013). Trends in the food service industry: A focus on quick-service restaurants. *International Journal of Hospitality Management*, 29(6), 372-386.
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