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UTILIZING RED HIBISCUS ROSA-SINENSIS IN DEVELOPING A FLAVORED DESSERT: GUMAMELA ICE CREAM

Melvin Ros Alcazar*, Jhosua Cacao, Kristine Ann Iwarat, Alyson Jane Mercado, Kathrina Ribao, Christine Jean Sesperes, Ybethe Castillo, Maureen Perez

LPU-Laguna, Philippines

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****Corresponding author: Melvin Ros Alcazar,***

ABSTRACT

This study explored the potential of utilizing edible flowers, specifically red gumamela, as a primary ingredient in the formulation of a floral-flavored ice cream dessert. The research aimed to devise a distinctive and innovative ice cream recipe incorporating gumamela petals as the central element, supplemented by additional components to enhance both flavor and nutritional profile. The investigation encompassed sensory analysis and assessment of the final recipe, encompassing taste tests and texture evaluations. Quantitative nutritional analysis was conducted to evaluate the health benefits associated with the inclusion of gumamela and alternative ingredients. The experimental framework entailed the development of various prototypes of Gumamela ice cream, each featuring distinct compositions of ingredients. The study sought to diversify the range of available ice cream offerings by introducing a novel frozen dessert derived from botanical sources, thereby promoting health-conscious choices. The outcomes of this research may hold implications for the food industry, fostering the adoption of alternative ingredients in ice cream formulation to cater to the preferences of consumers seeking innovative and health-oriented options.

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INTRODUCTION

Sweet and enticing desserts possess an undeniable allure that captivates a majority of individuals, a culinary tradition spanning millennia and enduring in contemporary enjoyment. While these confections add a pleasant touch to any meal, their consumption can entail potential health risks that warrant caution. In recent years, a notable trend in culinary innovation has emerged, notably the advent of ice cream desserts. These innovations often involve the incorporation of beneficial substances into fats to create nutritionally enhanced treats or the exploration of alternative ingredients to formulate new products. Desserts, favored by many, often harbor excessive amounts of sugar and fat, which are linked to health issues such as obesity and diabetes (Selman et al., 2022). However, by integrating nutrient-rich and flavorful components into desserts, one can create indulgences that are both nourishing and satisfying (Forbes et al., 2019). Research by Pradhan et al. (2021) has highlighted the high levels of vitamins and antioxidants found in edible flowers, making them an attractive option for enhancing the nutritional value of desserts. Fernandes et al. (2019) conducted studies demonstrating the versatility of edible flowers in various food products, including desserts, for enhancing both taste and nutritional content. Additionally, edible flowers have been investigated for potential health benefits, such as reducing health risks and lowering body temperature during fever (Aziz et al., 2021). Despite the wealth of available literature on the internet and in other sources, there remains a dearth of research specifically focused on the culinary application of edible flowers. This study aimed to explore the feasibility of utilizing the edible flower hibiscus rosa-sinensis, commonly known as red gumamela, as the primary component in the creation of flavored ice cream desserts. The research involved sensory analysis and assessment of the acceptability of the resulting dessert products. The researchers sought to develop a dessert that not only satisfies the desire for sweetness but also offers essential nutrients and health benefits through the exploration of various recipes and ingredient combinations. Ultimately, this research had the potential to yield a dessert that is both healthier and more enjoyable, facilitating its incorporation into a balanced diet.

METHODOLOGY

The study involved first-year, second-year, and third-year students aged 18 to 23 from the CITHM Department at LPU-Laguna. Respondents were randomly selected regardless of their location. The survey requested their name and gender, and the Simple Random Sampling approach was utilized to determine the number of respondents. Researchers provided them with information about the evaluation and allowed them to participate or decline. The chosen

group was selected due to their enrollment in courses primarily related to cuisine and business, ensuring accurate and valuable data collection. Data collection took place at the school's location, and participants underwent sensory examination to confirm their willingness, qualifications, and capability to participate. The study aimed to provide valuable insights into the culinary and business-related courses of students. This section of the study provided an explanation of the materials utilized for data collection. Data collection for sensory analysis was contingent upon the production of a product. The table below displayed the ingredients for each formulation of the product, followed by the process utilized to produce the gumamela ice cream. The ingredients and technique for each formulation were the same, with the essential ingredient being gumamela, which was used in all formulations. The gumamela flower utilized in each formulation required varying quantities for the assessment of the ice cream. Utilizing a collection of formulas enabled the researchers to ascertain the preferred and well-received ice cream product through evaluation based on sensory analysis and overall acceptability. The researchers conducted an on-site survey to gather data on the production date of gumamela ice cream, a unique treat with a distinct flavor. The methodology demonstrated the precision of the product, providing a clear understanding of the researchers' concept. The survey utilized the 9-point Hedonic Scale rating, a widely-used scale in experimental research, to quantify sensory analysis and acceptability. The survey questionnaire was a closed-type or structured format, addressing the research gap and helping identify variables. The questionnaire included a sensory analysis of the product, evaluating its appearance, consistency, taste, texture, and overall acceptability. By using the chosen participants, the researchers identified potential improvements for the product in question. This structured approach addressed the research gap and provided valuable insights for the researchers.

Table 1. Gumamela Ice Cream Formulations

Ingredients	Formula 121	Formula 171	Formula 191
Fresh Red Gumamela	5g	9g	12g
Skimmed Milk	90g	90g	120g
Greek Yogurt	235g	180g	180g
Egg yolk	2pcs	2pcs	2pcs
Cornstarch	28g	35g	35g
Whipping Cream (non-dairy)	250g	250g	250g
Honey	150g	95g	95g
Water	100ml	100ml	100ml

Table 2. Sensory Evaluation of Gumamela Ice CreamFormulation 121

Dimension	Weighted Mean	Verbal Interpretation
Mouthfeel	2.42	Like Very Much
Taste	2.35	Like Very Much
Appearance and Color	2.00	Like Very Much
Texture	2.39	Like Very Much
General Acceptability	2.28	Like Very Much
Composite Mean	2.28	Like Very Much

Legend: 8.50 – 9.00 = Dislike Extremely; 7.50 – 8.49 = Dislike Very Much; 6.50 – 7:49 = Dislike Moderately; 5.50 – 6:49 = Dislike Slightly; 4.50 – 5.49 = Neither Like nor Disklike; 3.50 – 4.49 = Like slightly; 2.50 – 3.49 = Like Moderately; 1.50 – 2.49 = Like Very Much; 0.50 – 1.49 = Like Extremely

This study emphasized the significance of respondents as the main contributors to achieving the researchers' objectives. Individuals were entitled to privacy and safeguarding, and researchers upheld their dignity. Participants possessed a comprehensive understanding of the product and survey questionnaires, as they were actively engaged in physical tests and taste evaluations. Additionally, they had the option to voluntarily withdraw from the study if they chose to participate. All forms of reactions and opinions, whether expressed through words or non-verbal cues, were handled with utmost discretion. Ethical concerns were essential to ensure the smooth operation of the study, uphold the accuracy of the research paper, and safeguard the rights and safety of the respondents. The researchers were required to uphold stringent confidentiality throughout the entire process.

RESULTS AND DISCUSSION

The sensory evaluation of Gumamela Ice Cream, a fusion of gumamela and a health-conscious alternative substance, was meticulously conducted to gauge its sensory attributes and overall acceptability. The ingredients comprising this innovative dessert include Greek yogurt, skimmed milk, egg yolks, non-dairy whipping cream, honey, and water. Table 2 shows the aggregated mean score for all sensory qualities was recorded at 2.28, indicative of a mixed reception among participants. Notably, Mouthfeel emerged as the most prominent sensory attribute, garnering a commendable score of 2.42, owing to its smooth and contrasting texture. However, taste, ranked third among sensory attributes, encountered varied responses, potentially influenced by the heightened concentration of the alternative sweetener. While some participants found the Gumamela Ice Cream palatable, others perceived it as excessively sweet. The prominence of sweetness raises concerns regarding sugar consumption, which has been associated with adverse health effects such as obesity and elevated blood sugar levels, particularly concerning for individuals with diabetes.

The General Acceptability score, positioned third at 2.28, reflects the collective impression of participants, suggesting that the interplay of sensory factors significantly influenced the overall acceptability of the ice cream. Remarkably, the Gumamela Ice Cream Formulation received the lowest rating of 2.00 for its appearance and color. Notably, Formulation 191, characterized by a whiter and rougher texture reminiscent of traditional ice cream, garnered more favor for its color and appearance compared to Formulation 171, which exhibited a reddish-pink tint. Overall, the comprehensive sensory evaluation of Gumamela Ice Cream unveils areas for potential refinement, particularly in enhancing taste, texture, and overall acceptability. This insightful analysis underscores the iterative nature of product development, paving the way for informed adjustments to elevate the sensory experience and consumer satisfaction.

Table 3 presents the sensory evaluation of Formulation 171 for ice cream utilizing Red Hibiscus Rosa-Sinensis as a flavoring agent. The total composite mean for Formulation 171 is calculated at 1.83, denoting a moderate level of likability among participants. Notably, texture emerges as the paramount sensory attribute, distinguished by a decadent, velvety, and luscious consistency. The incorporation of gumamela flowers imparts a distinctive flavor profile, rendering the mixture more substantive. Variations in taste can be attributed to the overall recipe composition, ease of scooping, and visual appearance. The mouthfeel of the ice cream is characterized by a velvety texture, facilitated by the presence of honey, skimmed milk, and whipping cream. The addition of gumamela flowers and the smoothness derived from soy milk further enrich the overall taste experience. The parameter of general acceptance ranks fourth, with a score of 1.72, signifying a pronounced preference among participants. Regarding visual characteristics and hue, the ice cream exhibits a weighted average score of 1.70, indicating a strong preference or fondness among evaluators. However, the intense pink hue derived from the gumamela flower may not universally appeal to all individuals, and

Table 3. Sensory Evaluation of Gumamela Ice CreamFormulation 171

Dimension	Weighted Mean	Verbal Interpretation
Mouthfeel	1.90	Like Very Much
Taste	1.88	Like Very Much
Appearance and Color	1.70	Like Very Much
Texture	1.99	Like Very Much
General Acceptability	1.72	Like Very Much
Composite Mean	1.83	Like Very Much

Legend: 8.50 – 9.00 = Dislike Extremely; 7.50 – 8.49 = Dislike Very Much; 6.50 – 7:49 = Dislike Moderately; 5.50 – 6:49 = Dislike Slightly; 4.50 – 5.49 = Neither Like nor Disklike; 3.50 – 4.49 = Like slightly; 2.50 – 3.49 = Like Moderately; 1.50 – 2.49 = Like Very Much; 0.50 – 1.49 = Like Extremely

Table 4. Sensory Evaluation of Gumamela Ice CreamFormulation 191

Dimension	Weighted Mean	Verbal Interpretation
Mouthfeel	3.94	Like Slightly
Taste	4.41	Like Slightly
Appearance and Color	3.68	Like Slightly
Texture	4.55	Neither Like nor Dislike
General Acceptability	4.12	Like Slightly
Composite Mean	4.14	Like Slightly

Legend: 8.50 – 9.00 = Dislike Extremely; 7.50 – 8.49 = Dislike Very Much; 6.50 – 7:49 = Dislike Moderately; 5.50 – 6:49 = Dislike Slightly; 4.50 – 5.49 = Neither Like nor Disklike; 3.50 – 4.49 = Like slightly; 2.50 – 3.49 = Like Moderately; 1.50 – 2.49 = Like Very Much; 0.50 – 1.49 = Like Extremely

Table 5. Significant Differences between the three sample formulations in termsof its Sensory Evaluation

	121		171		191	
Variable	Weighted Mean	SD	Mean	SD	Mean	SD
Mouthfeel	2.42	1.29	1.90	1.46	3.94	1.89
Taste	2.35	1.19	1.88	1.25	4.41	2.41
App Color	2.00	1.08	1.70	1.20	3.68	2.34
Texture	2.39	1.41	1.99	1.57	3.00	3.00
Acceptability	2.28	1.20	1.72	1.19	4.12	2.45

Table 6. Fat Content Laboratory Test of Gumamela Ice Cream

Test Parameter	Results	Replicates	Test Method
Crude fat, %	15.37	15.94; 15.29; 10.79x	Roesse-Gottlieb Method

variations in freezing temperature may affect personal preferences regarding texture. The study endeavors to explore the application of sensory analysis to glean precise quantitative data concerning the impact of processing techniques on texture. However, there is a notable absence of data pertaining to the influence of operational settings on texture, suggesting an avenue for further investigation and refinement in future studies. The sensory attributes of the Low Fat Gumamela Ice Cream Formulation underwent thorough analysis, revealing texture as the most prominent attribute with a noteworthy ranking of 4.55 in table 3. The taste profile was largely attributed to the smooth texture of the base, which provided a pleasing juxtaposition appreciated by consumers favoring subtle and distinctive taste profiles. Mouthfeel followed closely as the third-highest contributor to overall acceptance, garnering a score of 4.12, with a varied response among participants, some finding it satisfactory while others noting excessive sweetness. The interplay of sensory experiences within the oral cavity was observed to significantly influence total satisfaction derived from the product, underscoring the importance of achieving a harmonious and impeccably balanced texture to enhance the overall appeal of ice cream to consumers. Conversely, the lowest ranking for Appearance and Color, attributed to Formulation 191, was attributed to its paler and rougher appearance. Respondents held moderately favorable perceptions regarding flavor, visual appeal, and texture, while offering a mildly favorable assessment of the product's aesthetic appeal, vividness of colors, and presentation. Regarding texture, respondents expressed a neutral opinion, perceiving it neither positively nor negatively. Overall, participants evaluated the product as moderately acceptable, evidenced by a composite average score of 4.14, indicative of a modest level of overall favorability. They accorded the product a moderate good rating, considering all its qualities collectively. In sum, the sensory attributes of the Low Fat Gumamela Ice Cream Formulation significantly contribute to overall consumer satisfaction and enjoyment.

The researchers employed substantial disparities to discern the relevance of a formulation that deviates significantly from another, employing statistical assessment to ensure reliability. The table above elucidates the formulation demonstrating marked divergence based on sensory evaluation. These variations encompass aspects such as tactile sensation in the mouth, flavor profile, consistency, visual presentation, and overall level of approval of the Gumamela ice cream. Analysis depicted in the table reveals that Formulation 171 yields markedly superior outcomes when juxtaposed with Formulations 121 and 191. Evaluation of the gumamela ice cream formula entailed comprehensive scrutiny of its mouthfeel, flavor profile, appearance, texture, and consumer acceptance. Formulation 171 emerged as the optimal choice, characterized by equitably proportioned measurements across all utilized ingredients. The table presents the Fat Content Result of the Gumamela Ice Cream, indicating a crude fat content of 15.37%. It's noteworthy that dairy milk and ice cream's saturated fats contribute to its creamy, velvety texture. Fat plays a crucial role in ice cream formulation, providing the product with its standard thickness and consistent structure. Additionally, the fat content serves as a stabilizer, reducing the surface tension between the liquid ingredients and air, thus facilitating the development and incorporation of air bubbles into the ice cream mixture. This process contributes to the desired texture and mouthfeel of the final product, enhancing its overall sensory appeal.

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