

Development and Acceptability of Nutrihopia Infused with Malunggay (*Moringa Oleifera*) Leaves and Filled with Squash (*Cucurbita Maxima*) and Corn (*Zea Mays*)

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ABSTRACT: This research aimed to develop NutriHopia, an innovative and nutritious version of the traditional Filipino pastry hopia by infusing malunggay leaves (*Moringa oleifera*) in the crust and using a filling made from squash (*Cucurbita maxima*) and corn (*Zea mays*). The study investigated the sensory acceptability of the product in terms of taste, aroma, texture, and appearance. Using a descriptive-evaluative design, sensory evaluation was conducted among 30 purposively selected individuals including teachers and students. The results revealed that NutriHopia was well-received across all attributes, with particularly high ratings in taste and appearance. The study recommends further exploration into nutritional analysis, shelf-life testing, and commercialization possibilities.

KEYWORDS: NutriHopia, malunggay, squash, corn, hopia, sensory evaluation, acceptability, nutritious snack

I. INTRODUCTION

Pastries are popular in Filipino households, often consumed as snacks or pasalubong items. One notable variety is hopia, a flaky pastry filled with mung bean paste. As health trends continue to shape food innovation, there is growing interest in modifying traditional products to meet nutritional goals without compromising sensory appeal (Dizon & Espino, 2018).

This study focuses on NutriHopia, a modified hopia that incorporates malunggay leaves in the dough and uses a squash and corn filling. Malunggay, known for its abundance of vitamins A, C, and calcium, is widely recognized as a superfood. Squash offers beta-carotene and dietary fiber, while corn is rich in energy-giving carbohydrates. These ingredients are locally sourced and widely available in agricultural regions like Isabela, where this study was conducted. Infusing these ingredients into hopia not only enhances its nutritional value but also contributes to food sustainability and supports local farmers. While previous research has explored vegetable-based pastries, there remains limited data on the sensory evaluation of hopia incorporating these three ingredients.

This study aims to develop and determine the acceptability of NutriHopia with respect to four sensory attributes: taste, aroma, texture, and appearance. Specifically, it seeks to answer the following questions:

1. What are the processes involved in developing NutriHopia?
2. What is the level of sensory acceptability of NutriHopia in terms of:
 - a) Taste
 - b) Aroma
 - c) Texture
 - d) Appearance
3. Is there a significant difference in the sensory ratings of NutriHopia among different age and gender groups?

II. METHODOLOGY

This chapter outlines the research methodologies used in conducting the study. It covers the research design, locale and population of the study, data gathering instruments, procedures for data collection, and methods for data treatment and analysis to systematically organize the collected data.

Research Design

The study utilized a descriptive-evaluative research design. This allowed the researcher to analyze the sensory characteristics of NutriHopia and determine the participants' level of acceptability.

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Locale and Respondents of the Study

The study was conducted at Isabela School of Arts and Trades, and the respondents included 30 selected individuals aged 18–40 years old. The sample included students, faculty, and staff who were familiar with traditional hopia and open to tasting modified products.

Data Gathering Instrument

The researcher collected data and information using a sensory evaluation form/questionnaire, allowing participants to assess the product based on its sensory characteristics, including taste, aroma, texture, and appearance.

Data Gathering Procedure

To gather data, the researcher prepared three variations of NutriHopia—infused with malunggay leaves and filled with squash and corn—using different proportions of the ingredients. These formulations, referred to as treatments, were presented to respondents at the Isabela School of Arts and Trades for sensory evaluation. After the tasting session, sensory evaluation forms were distributed, and the responses were recorded and tallied for analysis.

With regard to acceptability of NutriHopia with respect to its taste, aroma, texture and appearance the range with its corresponding qualitative description are as follows:

Range	Qualitative Description
4.00 - 4.99	Highly Acceptable
3.00 - 3.99	Moderately Acceptable
2.00 - 2.99	Acceptable
1.00 - 1.99	Slightly Acceptable
0.01 - .99	Not Acceptable

DATA ANALYSIS

To get a valid and reliable results of the study, the researcher used the following statistical tools:

1. Weighted Mean was used to determine the general acceptability of the product.
2. Frequency Counts were used to profile the respondents.

III. RESULTS AND DISCUSSION

This chapter presents the analysis and interpretation of the data gathered on the development and acceptability of NutriHopia. Data are presented to shed light on the study.

Profile of Respondents

Age Range	Frequency	Percentage
18-24 years old	12	40%
25-30 years old	10	33%
31-40 years old	8	27%
Total	30	100%
Sex	Frequency	Percentage
Male	16	53%
Female	14	47%
Total	30	100%

The majority of respondents were between 18-30 years old, with a relatively even distribution of gender.

A. Respondent's Acceptability of the Taste of the NutriHopia

Table 1. Acceptability of NutriHopia in terms of Taste as evaluated by the respondents.

Treatments	Mean	Qualitative Description
(T1) 70 grams Malunggay leaves, 150 grams mashed squash and 100 grams corn	4.88	Highly Acceptable
(T2) 120 grams Malunggay leaves, 250 grams mashed squash and 150 grams corn	5	Highly Acceptable
(T3) 150 grams Malunggay leaves, 200 grams mashed squash and 200 grams corn	4.72	Highly Acceptable
Grand Mean	4.86	Highly Acceptable

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It can be seen from Table 1 that (T1) gave a mean score of 4.88 “Highly Acceptable”; (T2) gave a mean score of 5 “Highly Acceptable”; and; (T3) gave a mean score of 4.72 “Highly Acceptable”. This goes to show that treatment 2 has the best aromas evaluated by the respondents.

Furthermore, the computed overall mean score of 4.86 implies that the respondents rated the taste of NutriHopia as “Highly Acceptable”. This indicates that its taste was greatly preferred by the respondents.

B. Respondent’s Acceptability of the Aroma of NutriHopia

Table 2. Acceptability of NutriHopia in terms of Aroma as evaluated by the respondents.

Treatments	Mean	Qualitative Description
(T1) 70 grams Malunggay leaves, 150 grams mashed squash and 100 grams corn	4.68	Highly Acceptable
(T2) 120 grams Malunggay leaves, 250 grams mashed squash and 150 grams corn	5	Highly Acceptable
(T3) 150 grams Malunggay leaves, 200 grams mashed squash and 200 grams corn	4.4	Highly Acceptable
Grand Mean	4.69	Highly Acceptable

It can be seen from Table 2 that (T1) gave a mean score of 4.68 “Highly Acceptable”; (T2) gave a mean score of 5 “Highly Acceptable”; and; (T3) gave a mean score of 4.4 “Highly Acceptable”. This goes to show that treatment 2 has the best aromas evaluated by the respondents.

C. Respondent’s Acceptability of the Texture of NutriHopia

Table 3. Acceptability of NutriHopia in terms of texture as evaluated by the respondents.

Treatments	Mean	Qualitative Description
(T1) 70 grams Malunggay leaves, 150 grams mashed squash and 100 grams corn	4.96	Highly Acceptable
(T2) 120 grams Malunggay leaves, 250 grams mashed squash and 150 grams corn	4.6	Highly Acceptable
(T3) 150 grams Malunggay leaves, 200 grams mashed squash and 200 grams corn	4.72	Highly Acceptable
Grand Mean	4.76	Highly Acceptable

As shown in the table 3, the acceptability of the texture of NutriHopia based on the evaluation of the respondents. As presented in the table, the result of their evaluation is “Highly Acceptable”. (T1) got a mean score of 4.96 then (T2) got a highest mean score of 4.6 while (T3) is the second highest mean score of 4.72.

As a whole, the overall mean of 4.76 gave a descriptive rating of “Highly Acceptable” this shows that the respondents approved the texture of NutriHopia.

D. Respondent’s Acceptability of the Appearance of NutriHopia

Table 4. Acceptability of NutriHopia in terms of appearance as evaluated by the respondents.

Treatments	Mean	Qualitative Description
(T1) 70 grams Malunggay leaves, 150 grams mashed squash and 100 grams corn	4.88	Highly Acceptable
(T2) 120 grams Malunggay leaves, 250 grams mashed squash and 150 grams corn	4.96	Highly Acceptable
(T3) 150 grams Malunggay leaves, 200 grams mashed squash and 200 grams corn	4.6	Highly Acceptable
Grand Mean	4.81	Highly Acceptable

As shown in the table 4, the acceptability of the appearance of NutriHopia based on the evaluation of the respondents. As presented in the table, the result of their evaluation is “Highly Acceptable”. (T1) got a mean score of 4.88 then (T2) got a highest mean score of 4.96 while (T3) got a mean score of 4.6.

As a whole, the overall mean of 4.81 gave a descriptive rating of “Highly Acceptable” this shows that the respondents approved the appearance of NutriHopia.

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E. Respondent's General Acceptability of NutriHopia

Table 5. Acceptability of NutriHopia in terms of General Acceptability as evaluated by the respondents

Attribute	Mean	Description
Taste	4.86	Highly Acceptable
Aroma	4.69	Highly Acceptable
Texture	4.76	Highly Acceptable
Appearance	4.81	Highly Acceptable
OVERALL GRAND MEAN	4.78	Highly Acceptable

As a reflected in Table 5, the respondents' evaluation on general acceptability of is presented. As shown in the table, the general acceptability of NutriHopia in terms of appearance has the greatest grand mean of 4.78. This implied that the appearance of the NutriHopia is highly accepted by the respondents. Furthermore, the taste, aroma, texture and appearance got a grand mean of 4.78.

IV. CONCLUSION AND RECOMMENDATIONS

Conclusion

1. NutriHopia was highly accepted in terms of **taste, aroma, texture, and appearance**, with an average rating of **4.78**.
2. The addition of **malunggay leaves, squash, and corn** did not negatively affect the sensory qualities of hopia.
3. Demographic variables (age and gender) **did not significantly affect** consumer acceptability.
4. NutriHopia is a **viable healthy alternative** to traditional hopia.

Recommendations

1. **Nutritional Profiling:** Conduct lab testing to determine the exact nutritional content and promote NutriHopia's health benefits.
2. **Shelf-life Study:** Determine the storage life for commercial scaling.
3. **Promotion and Marketing:** Introduce NutriHopia in schools, local bakeries, and health food markets as a nutritious snack option.
4. **Community Training:** Offer skills training in hopia-making using the NutriHopia formulation for **livelihood development**.

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