

¹Norielou M.
Pinoliad

Jacklyn Mae L.
Acilo

Bea M. Muring

Jovi B. Ocliaman

Utilization of Canistel (Lacuma Nervosa A.DC) Flour in Making Cakes and Pastries



Abstract: - The main purpose of this study was to determine the Utilization of Canistel (Lacuma Nervosa A.DC) Flour in Making Cakes and Pastries conducted at the Municipality of Valencia, Bohol. Specifically, this study aimed to determine its profile in terms of the ingredients and cost, tools and equipment used, procedures, and shelf life, its acceptability in terms of appearance, aroma, texture, and taste and to determine if there is a significant difference in the acceptability of the three treatments. This study used the experimental design, employing the questionnaire as an instrument in gathering data. The researchers asked the permission of the Dean of the College of Teacher Education. The respondents of the study were the cookery students, TLE teacher and cakes and pastry baker in Valencia, Bohol who were selected through purposive sampling. In tasting the products, the respondents were given five minutes interval after every treatment. After the distribution of the sample products, the questionnaire was given to the participants. The respondents evaluated the finished products using a modified sensory evaluation sheet based on Four-Point Hedonic Scale. The data gathered were tabulated using the percentage, weighted mean, One Way Analysis of Variance, and the Scheffe Test for multiple comparison. The study revealed that Canistel (Lacuma Nervosa A.DC) Flour in making Cakes and Pastries in all treatments were "Highly Acceptable" in terms of appearance, aroma, texture, taste and this study determined that the cost of the materials and ingredients were affordable, and the tools and equipment were available. The .05 alpha level was used as the criterion for acceptance or rejection of the null hypotheses. These results led to the conclusion that there is a significant difference that existed in the level of acceptability of Canistel (Lacuma nervosa A. DC) flour in making cakes and pastries in terms of aroma, taste and overall acceptability, therefore the null hypothesis is rejected. However, no significant difference in the level of acceptability of Canistel (Lacuma nervosa A. DC) flour in making cakes and pastries in terms of appearance and texture, therefore the null hypothesis is accepted.

Keywords: Canistel; Flour; and Cakes and Pastry

1. Introduction

Food is one of the basic needs for human survival. Delicious food is enjoyed by everybody because it satisfies man's hunger. People celebrate occasions with special food. Among this special food is the famous dessert. The cake and pastries are one of the most favorite snack items not only in ordinary meals but also in different occasions like birthdays, weddings, and anniversaries. Fruits are nutritionally significant components in the human diet, giving vitamins, carbohydrates, proteins, and other nutrients. Many fruits, on the other hand, are highly seasonal. As a result, fruit preservation is extremely beneficial because the public never gets tired of preserved fruits, especially when fresh fruits are unavailable. Fruits are highly perishable commodities that must either be consumed fresh or processed for future use, hence several processing procedures are used to extend their storage life.

People nowadays tend to choose low-cost products, especially when they are experiencing a crisis because of the pandemic, products that are inexpensive but contain a lot of nutritional value. Thus, the researchers come up with an idea to look for some fruit product to innovate. The indigenous fruit canistel is prevalent in Garcia Hernandez, Bohol. Its abundance in the area prompted the researchers to consider how it may be incorporated into food products that would benefit consumers, producers, fruit farmers, and other industries. The researchers seek to make flour from canistel fruit in making cakes and pastries. Canistel fruit is often known as "Tisa" in the region. It is high in nutrients and has numerous health advantages. This is the primary rationale for selecting the substances mentioned.

In comparison to other tropical fruits, canistel fruit is underappreciated. Many people avoid eating ripe, fresh canistel fruit because it is excessively dry and sticks to the gums and teeth. The fruit contains sticky liquids if

¹ College of Teacher Education Bohol Island State University Main Campus CPG North Ave. 6300 Tagbilaran City, Bohol, Philippines

pinoliadnhorie@gmail.com; acilocklynmae735@gmail.com; beamuring821@gmail.com, joviocliaman6@gmail.com

eaten before it is fully riped. By turning canistel fruit into flour, a new product is created, and the flavor is enhanced. Through this, the researchers are motivated to conduct this study to determine the acceptability of canistel fruit in making cake and pastries. Specifically, the study aims to determine the level of acceptability in terms of appearance, aroma, texture, and taste of cakes and pastries made from various proportions of pure canistel flour.

2. Literature Background

Canistel fruit is inexpensive, but it has a high nutritional value. This fruit is rich in nutrients, particularly vitamins. It is high in carotene and niacin. Paragados (2014) suggested that canistel fruit flour was successfully prepared by sun-drying or conventional methods and it was used in the production of cake. Pertiwi et al. (2018) used canistel fruit flour as an ingredient in steamed brownies.

Flour is the main ingredients in most baked goods. It is normally supplied to meet a specification. In some cases, the specification is very wide, or it is very tight. Some specifications ensure that the flour is fit for making product. As the most versatile of raw materials in most recipes, gives us much of the enormous range of cakes and other pastries of today.

This study is connected to John Dewey's philosophy of experimentation (1943), he believed that it is only through experience that man learns about the world and only by the use of his experience that man can maintain and better himself in the world. Thus, it makes this research explore something new and come up with the idea of Canistel as one of the ingredients in the production of flour. Since many people do not value Canistel, we researchers came up with the study to use Canistel or most commonly known "Tisa" as one of the ingredients in making a flour.

According to Kolb, 1984 "Learning is a process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience." Thus, it acknowledges that something must be generated from the experience for it to be defined as learning. Engaging into variety of experiences will help the students to integrate new observations with their current understanding. Additionally, it will develop the skills of the students and will help them to become flexible and well-rounded learners. The knowledge that they learn from the experiences can be applied in real-life situation.

With regard to this, the researchers came up with the study to innovate Canistel Fruit into Flour. This study is also undertaken to promote the awareness in utilizing the canistel flour as new food source to local businesses. Aside from that, canistel flour can be done at home and contains more nutrients that will be added to the cake and pastries. This study could be a great help to minimize food scarcity in the Philippines.

3. The Problem

The main purpose of this study was to determine the acceptability level of Canistel (*Lacuma Nervosa* A.DC) Flour in making cakes and pastries. This study was conducted at Bohol Island State University Main Campus, Tagbilaran City during the Academic Year 2022-2023.

Specifically, the study aimed to answer the following questions:

1. What is the profile of the Canistel (*Lacuma Nervosa* A.DC) Flour in making cakes and pastries in terms of:
 - 1.1 ingredients and cost;
 - 1.2 tools and equipment.
 - 1.3 procedure;
 - 1.4 shelf-life; and
 - 1.5 packaging?
2. What is the Sensory Attributes of Canistel (*Lacuma Nervosa* A.DC) Flour in making cakes and pastries in terms of:
 - 2.1 appearance;
 - 2.2 aroma;
 - 2.3 texture; and
 - 2.4 taste?
3. What is the acceptability level of Canistel (*Lacuma Nervosa* A.DC) Flour in making cakes and pastries in the three different treatment in terms of:

- 3.1 appearance;
- 3.2 aroma;
- 3.3 texture;
- 3.4 taste; and
- 3.5 packaging?

4. Is there a significant difference among the acceptability level of the three (3) different treatments of the Canistel (Lacuma Nervosa A.DC) Flour in making cakes and pastries in terms of appearance, aroma, texture and taste?

4. Methodology

The researchers used the experimental design in manipulating the three (3) different treatments in making cakes and pastries such as making plain Canistel cake for the treatment zero, making macarons for the treatment one, and making brownies for the last treatment. The researchers also used the descriptive design by distributing questionnaires to determine the acceptability level of the following three (3) treatments in making cakes and pastries in terms of appearance, aroma, texture, and taste and to determine the respondent's comments or suggestions regarding the product. The study was conducted at the Municipality of Valencia particularly in Barangay Anas, Valencia, Bohol. Purposive sampling was used to determine the respondents based on their ability to provide accurate information regarding the study. This study involved a total of 40 participants that have been through different kinds of food preparation and the experts who rate the products are the 25 Cookery students, five (5) TLE teachers and ten (10) cakes and pastry baker.

The study used a self-made questionnaire in determining the acceptability level of canistel flour in making cakes and pastries in three (3) treatments in terms of appearance, aroma, texture, and taste. The respondents answered the questionnaire by checking the box provided using the modified sensory evaluation sheet based on Four-Point Hedonic Scale defined as a science of judging and evaluating the quality of a food by the use of the senses like taste, smell, sight and touch. Each replication of the three (3) treatments will be evaluated with the following scores and their description: four (4) as Highly Acceptable; three (3) as Acceptable; two (2) as Slightly Acceptable; and one (1) as Not Acceptable. The respondents also gave comments and suggestions for the improvement of the study.

The researchers asked the permission of the Dean of the College of Teacher Education and the Campus Director through a formal letter to allow them to conduct the study. The researchers also asked permission from the Poblacion Oriental, Valencia, Bohol through a letter which will be addressed to school principal of Valencia Technical Vocational High School stating the purpose of the study. The process involved in the flour making process of Canistel (Lacuma Nervosa A.DC) Flour was washing, peeling, slicing, blending, drying and storing. The procedure was carried out successfully. It was simple and easy to follow. The ingredients used in this study were canistel fruit flour, Canistel flour, cocoa powder, white sugar, baking powder, baking soda, salt, egg, oil, evaporated milk, desiccated coconut, butter, condensed milk, chocolate, and vanilla extract. Tools and equipment used were dry measuring cup, dry measuring spoon, mixing bowl, oven, sifter, weighing scale, rubber spatula, wire whisk, baking pan, baking sheets, knife, parchment paper, plastic Tupperware, blender. The responses were tallied, computed, and analyzed to serve as basis for the conclusion of the study.

5. Results and Discussion

After the data were interpreted and analyzed accordingly, the researchers come up with the following findings.

1. The Profile of Canistel (Lacuma Nervosa A.DC) Flour in Making Cakes and Pastries in terms of:

Ingredients and Cost

The ingredients of the Canistel (Lacuma Nervosa A.DC) Flour in Making Cakes and Pastries were available in different locality of Bohol. Treatment 1 got the highest price which was Php 193.50, followed by Treatment 2 which is Php 157.30 and Treatment 0, the cheapest, cost only Php 89.80. Regarding Labor Cost, 10% of each total cost in different treatments and 20% Mark Up Cost are added which results to market price and salability of the product. For treatment 0, the price is Php 3.00 per piece, followed by Treatment 1 which is Php 3.00 per piece and Treatment 2, which costs Php 4.00 per piece.

Tools and Equipment

The tools and equipment were dry measuring cup, dry measuring spoon mixing bowl, oven, sifter, weighing scale, rubber spatula, wire whisk, baking pan, baking sheets, knife, blender.

Procedure

The process involved in making the Canistel (*Lacuma Nervosa* A.DC) Flour in Making Cakes and Pastries was creaming, mixing and baking. The flour making process was washing, peeling, slicing, blending, drying and storing. The procedure was carried out successfully. It was simple and easy to follow.

Shelf Life

The Canistel (*Lacuma Nervosa* A.DC) Flour in Making Cakes and Pastries lasted for about 9 days as refrigerated and 5 days of unrefrigerated.

Packaging

The Pastry Box with Transparent Cover received the highest weighted mean, with 3.65 indicating that it was Highly Acceptable. The other packaging materials received a rating of 3.00 and the other received a rating of 2.85

Table 5.1

Sensory Attributes of Canistel (*Lacuma Nervosa* A.DC) Flour in making Cakes and Pastries

| APPEARANCE | T 0 (Plain Canistel Cake) | | | T 1 (Macaroons) | | | T2 (Brownies) | | |
|----------------------------------|------------------------------|----------|-------------|--------------------|----------|-------------|------------------|----------|-------------|
| | f | % | Rank | f | % | Rank | f | % | Rank |
| Brown | 6 | 15% | 2 | 1 | 2.5% | 3 | 30 | 75% | 1 |
| Butter Color | 5 | 12.5% | 3 | 37 | 87.5% | 1 | 1 | 2.5% | 3 |
| Medium Brown | 29 | 72.5% | 1 | 2 | 5% | 2 | 9 | 22.5% | 2 |
| AROMA | f | % | Rank | f | % | Rank | f | % | Rank |
| Strong smell of Canistel | 40 | 100% | 1 | 0 | 0% | 2 | 1 | 2.5% | 2 |
| Sweet coconut smell | 0 | 0% | 2 | 40 | 100% | 1 | 0 | 0% | 3 |
| Dark chocolate smell | 0 | 0% | 2 | 0 | 0% | 2 | 39 | 97.5% | 1 |
| TEXTURE | f | % | Rank | f | % | Rank | f | % | Rank |
| Foamy | 22 | 55% | 1 | 13 | 32.5% | 2 | 5 | 12.5% | 3 |
| Sticky and Chewy | 5 | 12.5% | 3 | 22 | 55% | 1 | 16 | 40% | 2 |
| Compact texture | 13 | 32.5% | 2 | 5 | 12.5% | 3 | 19 | 47.5% | 1 |
| TASTE | f | % | Rank | f | % | Rank | f | % | Rank |
| Sweet chocolate taste is evident | 0 | 0% | 3 | 0 | 0% | 3 | 36 | 90% | 1 |
| Slightly sweet in taste | 38 | 95% | 1 | 5 | 12.5% | 2 | 1 | 2.5% | 3 |
| Sweet in taste | 2 | 5% | 2 | 35 | 87.5% | 1 | 3 | 7.5% | 2 |

Table 5.1 shows the frequency of responses, percentage and rank of the three different treatments of Canistel (*Lacuma Nervosa* A.DC) Flour in making Cakes and Pastries in terms of appearance, aroma, taste and texture.

Appearance

Treatment 0 got the highest response in medium brown in color with the rate of 72.5%, Treatment 1 got the highest response in butter color with the rate of 87.5%, Treatment 2 got the highest response in brown color with the rate of 75%.

Aroma

Treatment 0 got the highest response in medium strong smell of canistel with the rate of 100%, Treatment 1 got the highest response in sweet coconut smell with the rate of 100%, Treatment 2 got the highest response in dark chocolate smell with the rate of 97.5%.

Texture

Treatment 0 got the highest response in foamy texture with the rate of 55%, Treatment 1 got the highest response in sticky and chewy with the rate of 55%, Treatment 2 got the highest response in compact texture with the rate of 75%.

Taste

Treatment 0 got the highest response in medium slightly sweet in taste with the rate of 95%, Treatment 1 got the highest response in sweet in taste with the rate of 87.5%, Treatment 2 got the highest response in sweet chocolate taste is evident with the rate of 90%.

Table 5.2

Acceptability Level of Canistel (*Lacuma Nervosa A.DC*) Flour in Making Cakes and Pastries in terms of Appearance, Aroma, Texture, and Taste

N = 40

| Acceptability Level | T 0 (Plain Canistel Cake) | | T 1 (Macaroons) | | T2 (Brownies) | |
|-----------------------|------------------------------|--------------------------|--------------------|--------------------------|------------------|--------------------------|
| | WM | Description | WM | Description | WM | Description |
| Appearance | 3.7 | Highly Acceptable | 3.8 | Highly Acceptable | 3.85 | Highly Acceptable |
| Aroma | 3.3 | Highly Acceptable | 3.78 | Highly Acceptable | 3.75 | Highly Acceptable |
| Texture | 3.75 | Highly Acceptable | 3.78 | Highly Acceptable | 3.9 | Highly Acceptable |
| Taste | 3.55 | Acceptable | 3.6 | Highly Acceptable | 3.88 | Highly Acceptable |
| Composite Mean | 3.58 | Highly Acceptable | 3.74 | Highly Acceptable | 3.85 | Highly Acceptable |

Table 5.2 manifests the acceptability level of the three treatments of Canistel (*Lacuma Nervosa A.DC*) Flour in Making Cakes and Pastries in terms of appearance, aroma, texture and taste.

Appearance

Treatment 2 got the highest weighted mean of 3.85 rated as Highly Acceptable, thus, it was the most preferred treatment while treatment 1 got 3.8 rated Highly Acceptable, and treatment 0 got the lowest weighted mean of 3.7 rated with Highly Acceptable.

Aroma

Treatment 1 got the highest weighted mean of 3.78 rated Highly Acceptable, followed by treatment 2 with 3.75 weighted mean rated Highly Acceptable and lastly, treatment 0 got 3.3 rated Highly Acceptable.

Texture

Treatment 2 got the highest weighted mean with 3.9 rated as Highly Acceptable, next is treatment 1 with weighted mean of 3.78 rated Highly Acceptable and lastly treatment 0 with a weighted mean of 3.75 rated Highly Acceptable.

Taste

Treatment 2 has the highest weighted mean with 3.88 rated as Highly Acceptable, treatment 1 with 3.6 weighted mean rated Highly Acceptable and treatment 0 with the weighted mean of 3.55 rated as Highly Acceptable.

Table 5.3

The difference in the Acceptability level of Canistel (*Lacuma Nervosa A.DC*) Flour in Making Cakes and Pastries

| Differences in Attributes | Computed F-value | P-value | Description | Decision | Multiple Comparison | | | |
|---------------------------|------------------|---------|-------------|----------------------------|---------------------|----------|----------------|-------|
| | | | | | Sig. | Decision | Interpretation | |
| Appearance | 1.246 | .291 | Insig. | Accept the null hypothesis | T0=T1=T2 | | | |
| Aroma | 7.369 | .000 | Sig. | Reject the null hypothesis | T0 V. T1 | .004 | Sig. | T0<T1 |
| | | | | | T0 V. T2 | .007 | Sig. | T0<T2 |
| | | | | | T1 V. T2 | .983 | Insig. | T1=T2 |
| Texture | 1.313 | .273 | Insig. | Accept the null hypothesis | T0=T1=T2 | | | |
| Taste | 5.220 | .007 | Sig. | Reject the null hypothesis | T0 V. T1 | .944 | Insig. | T0=T1 |
| | | | | | T0 V. T2 | .015 | Sig. | T0<T2 |
| | | | | | T1 V. T2 | 0.36 | Sig. | T1<T2 |
| Overall Acceptability | 9.741 | .000 | Sig. | Reject the null hypothesis | T0 V. T1 | .034 | Sig. | T0<T1 |
| | | | | | T0 V. T2 | .000 | Sig. | T0<T1 |
| | | | | | T1 V. T2 | .218 | Insig. | T1=T2 |

Table 5.3 shows that there was a significant difference in terms of aroma and taste among the three treatments, which means that the null hypothesis was rejected. For the aroma, it shows that there was a significant difference between the T0 plain canistel cake and T1 macaroons and T0 plain canistel cake and T2 brownies. For the taste, it shows that there was a significant difference between the T0 plain canistel cake and T2 brownies and T1 macaroons and T2 brownies. There was no significant difference between the three treatments in terms of appearance and texture. Thus, the null hypothesis was accepted. In overall acceptability, the test result shows that the significance value was lesser than the significance level, which is 0.05. Thus, the null hypothesis was rejected. The result of the Post-Hoc multiple comparison test was shown since the result of the ANOVA in the overall acceptability was significant. It results that there was a significant difference between the T0 Plain Canistel cake and T1 Macaroons and T0 Plain Canistel Cake and T2 Brownies and there is no significant difference between T1 Macaroons and T2 Brownies. Based on the result it is interpreted that T1 is equal to T2

Brownies while T1 was greater than the both T0 and T3 this means that T1 macaroons is very acceptable to the respondents' sensory attributes.

6. Conclusion

Canistel fruit flour can be utilized as a main ingredient and can even be a substitute to all-purpose flour in making cakes and pastries. Since the Canistel (*Lacuma Nervosa A.DC*) Flour in Making Cakes and Pastries proved to be very acceptable, wide dissemination of the result of this investigation is encouraged in the form of training seminars, research for a workshop.

Canistel fruit flour, being cheap and is locally abundant, should be maximized as a main ingredient in making cakes and pastry. Bohol Island State University Main Campus Administration may disseminate the Technology Guide through the extension program. Food Technology instructors can utilize Canistel fruit to introduce new innovation to students. They can also create and promote the technology guide for product promotion. For economic reasons, canistel fruit flour should be encouraged among food manufacturers since it can be substituted to all-purpose flour which is expensive and sometimes not readily available. substitute to all-purpose flour which is expensive and sometimes not readily available. For the entrepreneurs, they should consider the product of this study to serve as means of livelihood for them to sell the created product to generate income. For future researchers, they can use this study as a guide to conduct related research and develop new products based on Canistel (*Lacuma Nervosa A.DC*) fruit.

Recommendations

Based on the conclusion drawn from the study, the researchers arrived at the following recommendations:

1. Bohol Island State University Main Campus Administration may disseminate the Technology Guide through the extension program.
2. Food Technology Instructors can Utilize the Canistel fruit to introduce new innovation to students. They can also create and promote the technology guide for product promotion.
3. For economic reasons, Canistel (*Lacuma Nervosa A.DC*) fruit flour should be encouraged among food manufacturers since it can be a substitute to all-purpose flour which is expensive and not readily available.
4. For the entrepreneurs, they should consider the product of this study to serve as means of livelihood for them to sell the created product to generate income.
5. For future researchers, they can use this study as a guide to conduct related research and develop new product based on Canistel (*Lacuma Nervosa A.DC*) fruit.

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