TALISAY TREE (TERMINALIA CATAPPA) NUT SPREAD

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Article Information

Received: 10 November 2022
Revised: 30 November 2022
Published: 22 Desember 2022

Keywords
Acceptability; Talisay Tree; Talisay Nut Spread

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Abstract

Talisay tree is commonly found along coastal areas, roadsides and parks, it is adapted to this type of habitat because it is salt and drought tolerant, best grown under full sun and is also resilient to strong winds during the rainy season. This tree is grown for its ornamental purposes and its edible nuts. This experimental study determined the level of acceptability of Talisay Tree (Terminalia Catappa) Nut Spread as to appearance, aroma, taste, texture and general acceptability in two formulations. This study also determined if there was a significant difference in the level of perception of the evaluators among the two formulations of Talisay Tree (Terminalia Catappa) Nut Spread. A survey questionnaire was used in gathering the data. The evaluators of the study were the thirty (30) nut spread vendors and consumers of Brgy. Qui-anan San Joaquin, Iloilo. Based on the results of the study, the appearances of the two formulations were perceived as "Light Brown" for the Formulation A and "Dark Brown" for the Formulation B. For the aroma, it was perceived as "Moderately Strong Talisay Nut aroma" for Formulation A and "Very Strong Talisay Nut aroma" for Formulation B. For the texture, both formulations was perceived "Very Smooth Talisay Nut" spread. In terms of taste, Formulation A has a "Very Pleasing Talisay Nut taste" and Formulation B has "Extremely Pleasing Talisay Nut Taste". Inferential statistics revealed that there is a significant difference in the sensory characteristics and the level of acceptability of talisay nut spread in terms of appearance, aroma, taste and texture. As to the general acceptability, both formulation A and B were "Liked Very Much". This implies that both sweetener used specifically the granulated sugar and muscovado sugar prepared by the researchers made an impact to the sensory acceptability of the spread. Thus, Talisay Nut Spread has the potential to be used as another flavored spread. It is recommended that further studies related to this research using other variables is encouraged to glorify other factors that relates to the Level of Acceptability of Talisay Nut Spread

1. Introduction

1.1 Background of the Study

Filipinos love coffee and a perfect pair for it is bread with a spread creating a great taste for their coffee time during morning and the afternoon. Most of the people love to add spread on their bread because of its delicious and versatile taste. Its aromatic and creamy texture will help to make the bread less dry. The fact that there are many flavors to choose to be added in bread that makes its favorite food for everyone. People don't like to stick with just one flavor but rather try something new that is different from what they taste.

The talisay "Terminalia Catappa" tree, also known as the Indian Almond or Umbrella tree belongs to family Combretaceae is commonly found along coastal areas, roadsides and parks. It is adapted to this type of habitat because it is salt and drought tolerant, best grown under full sun and is also resilient to strong winds during the rainy season. This tree is grown for its ornamental purposes and its edible nuts. The nut kernels are edible and can be eaten raw but a fibrous shell surrounds the nut. It can be a challenge to remove the nut from the hard shell.

The Talisay seed is well-known in most provinces in the Philippines. It blooms from November-March. There are only few people who knows what Talisay seed is. One of the primary reason why this research was conducted is to expand the choices of flavors for everyone, somehow, this Talisay seeds is still unnoticed for its capability to use as a new flavor. This study aimed to establish the potential of Terminalia Catappa fruit as another flavoring nut spread. This study further determines the general acceptability of the flavoring nut spread products from Talisay seeds and determine the most acceptable sweetener for Talisay Nut Spread as per preference of the consumers regarding its sensory attributes: appearance, aroma, texture, taste and general acceptability.

1.2 Statement of the Problem

This study was conducted to determine the acceptability of Talisay Nut Spread in two formulations. Specifically, this would like to achieve the following objectives:

1. What is the level of perception of the evaluators on the Talisay Nut Spread using granulated sugar as sweetener as to appearance, aroma, texture, taste, and general acceptability from other spread?

2. What is the level of perception of the evaluators on the Talisay Nut Spread using muscovado sugar as sweetener as to appearance, aroma, texture, taste, and general acceptability from other spread?

3. Is there a significant difference in the level of perception on the evaluators on the Talisay Nut Spread in two formulations as to appearance, aroma, texture, taste, and general acceptability?

Hypothesis

There is no significant difference in the level of perception of the evaluators of Talisay Tree Nut Spread in two formulations as to appearance, aroma, texture, taste and general acceptability.

1.3 Theoretical Framework of the Study

This study was based on Thomassen (2003,) defines customer satisfaction as "the perception of the customer as a result consciously or unconsciously comparing their experiences with their expectations." Kotler & Keller (2008) build on this definition, stating that customer satisfaction is determined by the "degree to which someone is happy or disappointed with the observed performance of a product in relation to his or her expectations." Performance that is below expectations leads to a dissatisfied customer, while performance that satisfies expectations produces satisfied customers. Expectations being exceeded leads to a "very satisfied or even pleasantly surprised customer." (Kotler & Keller, 2003).

1.4 Conceptual Framework of the Study

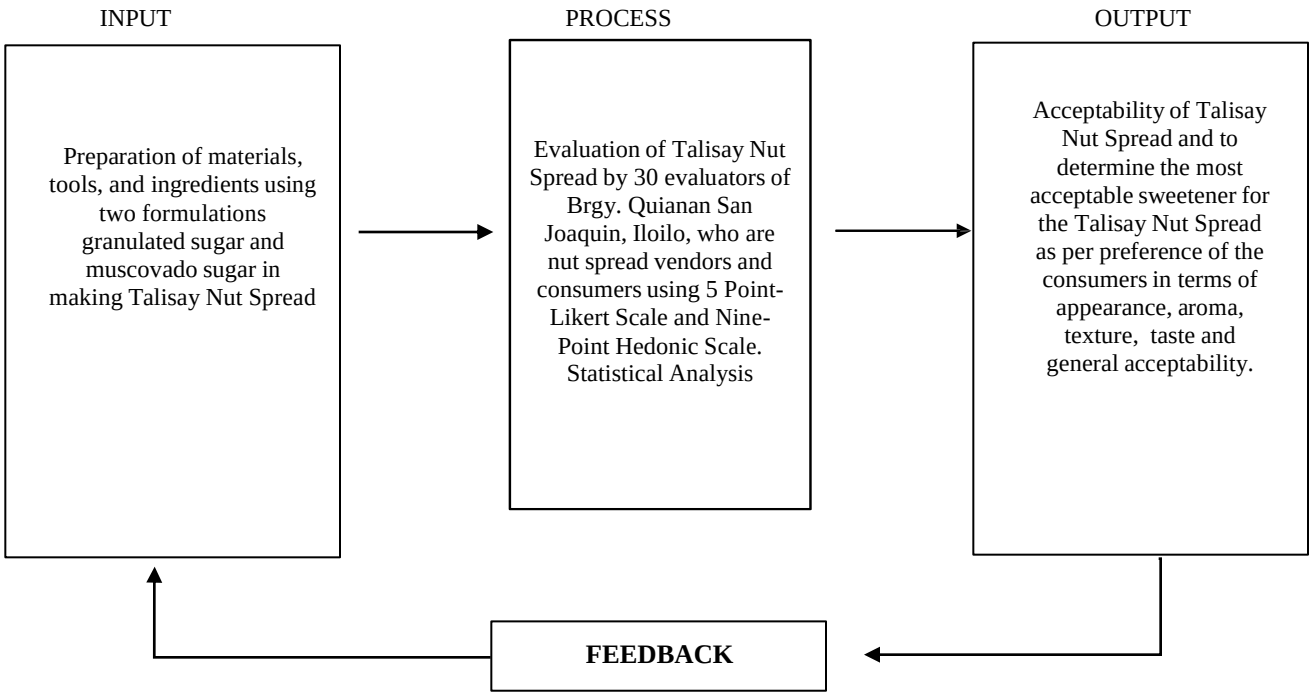

Fig 1. Schematic Diagram Illustrating the Framework of the Study

1.5 Scope and Delimitation of the Study

This study aimed to test the Talisay (Terminalia Catappa) nut as a new nut spread in terms of its sensory attributes such as appearance, aroma, texture, taste and general acceptability which is the primary objective of the researcher's. The locale of the study was conducted at Barangay Qui-anan, San Joaquin, Iloilo with the guidance of the research teachers. The participants included in the study were 30 random people who are nut spread vendors and consumers.

At the end, the researcher's used a questionnaire which was the proposed instrument that was given to the respondents. The study used Likert Scale Range of means to describe the weighted mean of appearance, aroma, taste, texture and taste, while the Hedonic Scale Range of means for general acceptability. T-test was employe to test the significance of the difference of the mean in two formulations.

1.6 Significance of the Study

This study was significant for it benefits the sectors and group of persons:

General Consumers. This study will provide another choice for a certain nut spread product to the general consumers that love to complement nut spread to our local bread. It will provide the kind of spread product that gives beneficial nutrients to their bodies.

Nut spread Vendors and *Entrepreneurs*. This study will improve the lives of vendors and entrepreneurs by increasing their income.

Marketplace. Nut based spread industry is highly competitive with other competitors. Producing another flavored spread will rise another competition. A certain unheard product can increase the profitability and production of company and offer wider variety of spread to its consumer.

Students. This study provided valuable information and knowledge about the significance of the Talisay Tree "Terminalia Catappa" as a nut spread and encouraged them to appreciate and patronize home made products.

Local Farmers. This study gives opportunity to our local farmers to add the Talisay Tree as a variety of tree to be raised as new material for them to gain more profit.

Local Government Unit. The result of this study, can provide a necessary action and sense of appreciation on how to promote and preserve the local and organic products made of Talisay Tree (Terminalia Catappa). Future Researchers. This study can serve as a reference guide in the future researcher's research undertaking that is related to the Talisay (Terminalia Catappa). Other researchers from different places are motivated to look for new set of ideas and knowledge.

2. Research Methods

2.1 Research Design

Experimental Research Design was used by the researchers in the study to test the hypothesis by reaching valid conclusions about relationships between independent and dependent variables. On the cited study of J.P Chain, (1975), experimental method is a technique of discovering information by means of experimentation.

2.2 Evaluators of the Study

The evaluators of the study were the thirty (30) nut spread vendors and consumers, located at Barangay Qui-anan, San Joaquin, Iloilo. The evaluators evaluated the Talisay (Terminalia Catappa) nut spread flavor and answered the survey questionnaire for the formulation of quantitative findings and analysis.

2.3 Data Gathering Instrument

In order to achieve the objectives of this study, the researchers made a letter addressed to the Campus Administrator and a letter to the evaluators. The researchers made a questionnaire as the proposed research instrument in gathering data from the sample. The researchers prepared a Sensory Evaluator Score Sheets to the evaluators. The evaluators evaluated the Talisay Nut Spread as to appearance, aroma, texture, taste, and general acceptability by checking the corresponding columns using the Five-Point Likert Scale and Nine Point hedonic Scale.

The Sensory Evaluation Score Sheet were gathered, tabulated, and analyzed using the SPSS.

2.4 Materials

The following materials used in the processing of Talisay (Terminalia Catappa) Nut Spread: measuring spoon, digital weighing scale, induction stove, spatula, electric hand mixer/ blender, pan, measuring cup, plastic container

The following ingredients were used in the processing of Talisay (Terminalia Catappa) Nut Spread:

Table 1. Ingredients were used in the processing of Talisay (Terminalia Catappa) Nut Spread

Talisay Nut Spread Formulation A: Granulated Sugar	Talisay Nut Spread Formulation B: Muscovado Sugar
○ 255 grams of whole talisay nut	○ 255 grams of whole talisay nut
○ 80 grams of granulated sugar	○ 80 grams of muscovado sugar
○ 1 gram of salt	○ 1 gram of salt
○ 60 ml cooking oil	○ 60 ml cooking oil

2.5 Data Gathering Procedure

The data gathering procedure were divided into three phases:

Phase I- Gathering and Identification of Talisay Seed

1. Matured Talisay seeds that were fallen from the tree were collected on the shore of Brgy. Manhara San Joaquin, Iloilo.

2. Talisay seeds that are light brown to dark brown in color were the primary material used in the experimentation.

3. The seeds were exposed directly on sunlight for 30 minutes to 1 hour in the span of three days starting from the date it was gathered.

4. The dried talisay seeds were collected and weighed.

Phase II- Processing of Talisay Nut

The following steps are the preparation in processing Talisay Nut

1. The talisay seed were cracked and the nuts were pulled out.

2. The talisay nut was washed with running water.

3. To remove the excess water the talisay nuts were pressed using a tissue paper.

4. The talisay nuts were dried and exposed under the sun for about 30 minutes.

5. Dried talisay nuts were placed on a clean container before processing.

Phase III- Cooking Procedure:

Prep. Time: 15 minutes

Cooking Time: 35 minutes

Cooling Time: 15 minutes

Total Time: 1 hr. 5 mins.

Formulation A

1. The Talisay Nut were roasted in a pan for 15 minutes using an induction stove on a low fire set at (80˚C).

2. It was cooled down for 5 minutes.

3. The talisay nuts were transferred into a food processor or blender. The nuts were pulsed several times to get them initially broken up. It was processed continuously at high speed for 5 minutes.

4. The talisay nut solids clumped together into a mas and its oil coalesced as well. It was blended until they are powderized.

5. The talisay nut were processed for 5 minutes at high speed until it created a thicker and chunky textured talisay nut.

6. Granulated sugar were added in the processed talisay nut. The sides were scraped down using a spatula. It was blended for a minute until it became super-smooth.

7. 1 gram of salt was added in the talisay nut.

8. Oil was added in the talisay nut and it made the talisay nut smoother and spreadable.

9. Lastly, it was processed for 1 to 5 minutes, until a smooth and warm pourable talisay nut spread was formed. The talisay nut spread were cooled down, it was spooned into a clean airtight jar or plastic container.

Formulation B

1. The Talisay Nut were roasted in a pan for 15 minutes using an induction stove on a low fire at (80˚C).

2. It was cooled down for 5 minutes.

3. The talisay nuts were transferred into a food processor or blender. The nuts were pulsed several times to get them initially broken up. It was processed continuously at high speed for 5 minutes.

4. The talisay nut solids clumped together into a mas and its oil coalesced as well. It was blended until they are powderized.

5. The talisay nut were processed for 5 minutes at high speed until it created a thicker and chunky textured talisay nut.

6. Muscovado sugar were added in the processed talisay nut. The sides were scraped down using a spatula. It was blended for a minute, until it became super-smooth.

7. 1 gram of salt was added in the talisay nut.

8. Oil was added in the talisay nut that made the talisay nut smoother and spreadable.

9. Lastly, it was processed for 1 to 5 minutes, until a smooth and warm pourable talisay nut spread was formed. The talisay nut spread were cooled down, it was spooned into a clean airtight jar or plastic container.

2.6 Data Processing Techniques

To quantify the responses and to have an accurate assessment and interpretation on the data gathered, the responses to the items of every questionnaire were manually scored. For validity and reliability of interpretation of data, statistical tools were utilized.

Mean, standard deviation, t- test, Five-point Likert scale, and Nine- point Hedonic scale were used.

Mean. It was used in the study to find and show the central value or average score of two formulations in the Talisay (Terminalia Catappa) Nut Spread from the evaluators in terms of appearance, aroma, texture, taste and general acceptability.

Standard Deviation. It was used to determine the homogeneity of the subject in terms of different variables in the study. To determine whether there is a significant difference in the level of general acceptability of Talisay Tree Nut Spread, t-test was employed at 0.05 % level of significance. The results of this statistical statement were provided for the analysis and interpretation of data. The findings were used as basis in making the appropriate conclusions and recommendations.

Table of Interpretation

Table 2. Appearance (color)

Description	Scale
Dark Brown	4.21- 5.00
Brown	3.41- 4.20
Light Brown	2.61- 3.40
Pale Brown	1.81-2.60
Pale	1.00-1.80

Table 3. Aroma

Description	Scale
Extremely strong talisay nut aroma	4.21- 5.00
Very strong talisay nut aroma	3.41- 4.20
Moderately strong talisay nut aroma	2.61- 3.40
Slightly strong talisay nut aroma	1.81-2.60
Don't have talisay nut aroma	1.00-1.80

Table 4. Texture

Description	Scale
Extremely smooth talisay nut	4.21- 5.00
Very smooth talisay nut	3.41- 4.20
Moderately smooth talisay nut	2.61- 3.40
Slightly smooth talisay nut	1.81-2.60
Not smooth talisay nut	1.00-1.80

Table 6. Taste

Description	Scale
Extremely pleasing talisay nut taste	4.21- 5.00
Very pleasing talisay nut taste	3.41- 4.20
Moderately pleasing talisay nut taste	2.61- 3.40
Slightly pleasing talisay nut taste	1.81-2.60
Not pleasing talisay nut taste	1.00-1.80

The Nine-point Hedonic Scale were used in the evaluation of acceptability

Table 7. General Acceptability

Description	Scale
Liked Extremely	8.21- 9.00
Liked Very Much	7.23- 8.20
Liked Moderately	6.32- 7.22
Liked Slightly	5.45- 6.33
Neither Liked or Disliked	4.67- 5.44
Disliked Slightly	3.67- 4.66
Disliked Moderately	2.78- 3.76
Disliked Very Much	1.89- 2.77
Disliked Extremely	1.00-1.80

3. RESULTS AND DISCUSSIONS

This chapter presents the descriptive and inferential data gathered from the evaluators of the study and their respective analysis and interpretation.

Descriptive Data Analysis

Fig 8. The Perception of the Respondents on Identified Characteristics on the Two Formulations of the Talisay Nut Spread

Characteristics	*M (SD)*	Description
Appearance		Light Brown
Formulation A	3.36 (.764)	Dark Brown
Formulation B	4.83 (.647)	
Taste		Very Pleasing
Formulation A	3.76 (1.040)	Extremely Pleasing Talisay Nut Taste
Formulation B	4.83 (.647)	
Texture		Very Smooth
Formulation A	3.90 (.922)	Very Smooth
Formulation B	3.76 (1.006)	
Aroma		Moderately strong
Formulation A	2.96 (1.425)	Very strong Talisay Nut Aroma
Formulation B	3.96 (.964)	
General Acceptability		Liked very much
Formulation A	7.26 (1.460)	Liked very much
Formulation B	8.06 (1.080)	

Fig 1 the perception of the evaluators on identified characteristics of the different formulation of Talisay Nut Spread. In terms of appearance, Formulation A is light brown (M= 3.36; SD= 0.764) while Formulation B is dark brown (M= 4.83; SD= 0.647). This implies Formulation B (muscovado sugar) used in Talisay Nut Spread produces a dark color of the spread. This was expected result for the Talisay Nut Spread appearance as muscovado sugar are naturally dark brown in color.

In terms of taste, Formulation A has a very pleasing talisay nut taste (M= 3.76; SD= 1.040) while Formulation B has an extremely pleasing talisay nut spread taste (M= 4.83; SD= 0.647). This means that Formulation A produced a better taste because of the additional taste of the muscovado sugar to the Talisay nut spread.

For the texture, Formulation A (M= 3.90; SD= 0.922) and Formulation B have (M= 3.76; SD= 1.00) has a very smooth texture. Having the same amount of sweetener added to the talisay nut gives the same texture to the spread.

In terms of aroma, Formulation A has a moderately strong aroma (M= 2.96; SD= 1.42) while formulation B has a very strong talisay nut aroma (M= 3.96; SD= 0.964). This means that there is a difference on the aroma depending on the sweetener used as it affects the aroma of the spread.

Lastly, as for the general acceptability, Formulation A (M= 7.26; SD= 1.46) and Formulation B (M= 8.06; SD= 1.080) was liked very much by the evaluators. This implies that both formulations were preferred by evaluators.

Based on the results of the study, the aroma, taste, and texture as perceived by the evaluators have the same descriptions in all formulations of the Talisay Nut Spread.

Results also revealed that the sweetener used in talisay nut using two formulations did alter the appearance of the talisay nut spread. Moreover, nut spread vendors and consumers liked the two formulations because of the taste, texture, and aroma of the talisay nut spread.

Inferential Analysis

The significance of the differences in this investigation was derived by using t-test for independent samples.

Fig 2. Differences in the Perception of the Identified Characteristics of the Two Formulations of Talisay Nut Spread.

Characteristics	*M*	df	*t*	*p*
Appearance				
Formulation A	3.36		-8.015	.000
Formulation B	4.83	56		
Taste				
Formulation A	3.76		-3.539	.001
Formulation B	4.83	45		
Texture				
Formulation A	3.90	58	.535	.595
Formulation B	3.76			
Aroma				
Formulation A	2.96		-3.182	.002
Formulation B	3.96	51		
General Acceptability				
Formulation A	7.26	58	-2.412	.019
Formulation B	8.06			

**significant at $p < 0.05$*

Fig 2 shows the differences in the perception of identified characteristics of the different formulation of talisay nut spread. Data revealed that as to appearance, there is a significant difference existed between the two formulations (df = 56; t= -8.01, p = 0.000). As to taste, there is a significant difference between the two formulations (df= 45; t= -3.53, p= .001). As to texture, there is a no significant difference between two formulations (df= 58; t= .535, p= .595). As to aroma, there is a significant difference between the two formulations (df= 51; t= -3.53, p= 0.002). Lastly, the general acceptability of the two formulations are not significantly different from each other (df= 58; t= -2.41, p = 0.19). Therefore, the null hypothesis which states that there is no significant difference in the perception of the evaluators on talisay nut spread in two formulations was rejected in terms of appearance, taste and aroma. However, the null hypothesis which states that that there is no significant difference in the perception of the evaluators on talisay nut spread in two formulations was not rejected in terms of texture and general acceptability.

4. Conclusions

Based on result of the study, the following conclusions were made:

The evaluators liked very much the Talisay Nut Spread in both Formulation A and B. This implies that both sweetener used specifically the granulated sugar and muscovado sugar prepared by the researchers were preferred by the evaluators. It was concluded that the talisay nut spread were acceptable to the evaluators. Talisay Nut Spread has the potential to be used as another flavored spread.

Recommendations

Based on the findings and conclusions the researchers recommend the following:

Since the general acceptability of talisay nut spread was liked very much for Formulation A and B, huge production is recommended. Nut spread vendors may have the opportunity to open up a new flavor of spread which is packed with nutrients for the consumption of everybody. Local Entrepreneurs are recommended to use talisay as an innovation for new products in their business and incorporate talisay nuts in making spread.

Food specialist or experts may provide insights and give lectures about creating healthy talisay nut spread flavor. Local community are encouraged to plant more talisay trees to be used for different food preparations such as spread, bread and others. Culinary instructors are recommended to use Talisay nut as spread as additional formulation in nut spread making, as well as to teach students about the nutritive values in applying laboratory activities and create more nutritious spread.

Students are recommended to continuously plant trees specifically Talisay Trees for the sustainability of the Talisay nuts to be used in preparing Talisay Nut Spread. Future researchers may use this research as a baseline information to other related studies and continue in researching which could possibly bring another unique flavor in the future.

Implications

According to the findings and discussion explained, Talisay Nut Spread is just like some other spread. The sweetener used, were preferred by the evaluators. The utilization of Talisay Nut Spread as a new protein product could positively had its potential to be introduced in the market for commercialization.\

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