

**SENSORY EVALUATION OF THE HOMEMADE GIANT SWAMP TARO
(*Cyrtosperma chinensis*) ICE CREAM: A PROPOSED
TECHNOLOGY GUIDE**

**College of Technology and Allied Sciences
BOHOL ISLAND STATE UNIVERSITY
Zamora, Bilar, Bohol**

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June 2021

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TECHNOLOGY GUIDE**

A Thesis
Presented to the Faculty of the
College of Technology and Allied Sciences
BOHOL ISLAND STATE UNIVERSITY
Zamora, Bilar, Bohol

In Partial Fulfilment
Of the requirement for the
degree of Bachelor in Science and Industrial Technology
Major in Food Preparation Service Management

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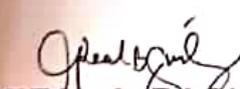
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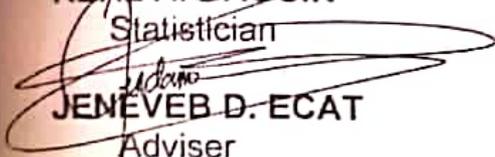
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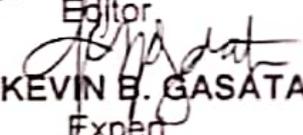
This thesis entitled "**SENSORY EVALUATION OF HOMEMADE GIANT SWAMP TARO (*Cyrtosperma chamissonis*) ICE CREAM: A PROPOSED TECHNO GUIDE**", prepared and submitted by Rogelio P. Jagutin Jr, Jovelyn C. Mejorada, Genesal P. Anunciado, Mary Jane G. Daverao in partial fulfillment of the requirements for the degree of Bachelor in Science of Industrial Technology major in Food Preparation Service Management has been examined and recommended for acceptance and approval for oral defense

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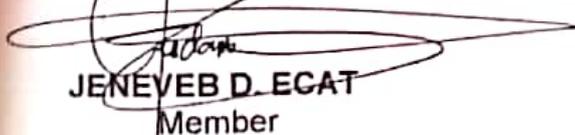

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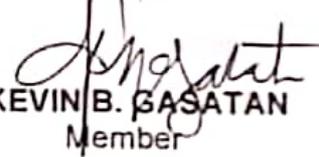
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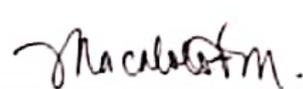

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ACKNOWLEDGMENT

The researchers took this chance to express their immeasurable and wholehearted thanks to the **Almighty Father** for His bountiful blessings, unequalled wisdom and unfailing Divine Guidance for making the completion of this work possible.

Special gratitude is also extended to the following persons of their invaluable assistance, guidance, support and encouragement:

Jeneveb D. Ecat, Thesis Adviser, for giving her time, effort, suggestion and sharing her brilliant ideas and professional guidance.

John Anthony D. Piollo, Thesis Editor, for his time, effort patience refining the draft and final copies this research;

Real A. Baguin, Thesis Statiscian, for his support in the statistical computations and interpretation of data, experience and encouragement.

Nelia Q. Catayas, Ph.D., Research instructor, for her support and sharing her expertise which contributed to the enhancement this study;

Arlen B. Gudmalin, Ph.D. Dean of CTAS, for her approval to conduct our study;

Marietta C. Macalolot, Ph.D. Campus Director, for her approval to conduct our study;

To the **DHMIT students** in BISU-BILAR, who were eager and honest in answering the questionnaire;

To the **parents and guardian: Rogelio Jagutin Sr and Erlinda Jagutin, Eustaquio Anunciado, Antonia Anunciado and Eduardo Mejorada, Calixta Mejorada and Heracleo Daverao Sr. and Hilda Daverao** for the financial, moral and spiritual support; and for their never ending advice that served as our motivation and strength to keep on going and for the courage to face all the difficulties and challenges on doing the study.

**Genesal
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ABSTRACT

The study was conducted to determine the acceptability level of Homemade Giant Swamp Taro. The study used the 5-Hedonic Scale questionnaires provided to forty (40) respondents consisting of twenty-five students of Bachelor of Science in Industrial Technology Major in Food Preparation Service Management; ten (10) students of Bachelor of Science in Hospitality Management; ten (10) students of Bachelor of Science in Hospitality Management II and five (5) faculties who are handling food related courses. They are chosen as participants because they are exposed in theory, as well as in the actual field of cooking. The questionnaires were distributed, retrieved and tallied for the analysis and interpretation of data using the weighted mean with descriptive interpretation. The data was processed using the weighed mean and F-test to determine the difference between the four treatments in terms of appearance, aroma, taste and mouthfeel. In the acceptability level of Homemade Giant Swamp Taro (*Cyrtosperma chamissonis*) in terms of appearance majority of the respondents preferred T2 and got the highest rate of 4.23% interpreted as "Extremely Like" across all treatments. And, in terms of Aroma and Texture, T2 again got the highest weighted mean of 4.25% and 4.09 % interpreted as "Extremely like". While, with regards to taste the T4 got the highest weighted mean of 4.33 % preferred by the respondents interpreted as "Extremely Like". In the visual quality assessment of homemade giant swamp taro ice cream, the four treatments were subjected to cool temperature storage and found out that no changes take place with the product even until the period of 19 days. This implies that T2 which composed of $\frac{1}{4}$ cup of mashed giant swamp taro added with 1 cup of nestle cream and 1 cup of condensed milk can be frozen product if stored at desired freezing temperature and further extend its good characteristics. Based on the result the null hypothesis was accepted. The study extremely recommends that the T2, Homemade Giant Swamp Taro Ice Cream can be proposed and developed for mass production because majority of the respondents preferred it; likewise, related studies to develop more products utilizing Giant Swamp Taro and other abundant resources in the locality may be conducted. Giant Swamp Taro Ice cream is a smooth, delicious and yummy food that can be consumed by both adults and young childrens.

Chapter 1

THE PROBLEM AND ITS SCOPE

Rationale

Ice cream is a sweetened frozen food typically eaten as a snack or dessert. This may be made from dairy milk or cream and is flavored with a sweetener. Taro with a mildly sweet very starchy tuber often used Asian dessert. With its light, nutty flavored work well especially in the preparation of ice cream. Cooking this type of root crop can release so much starch. Taro root can be an ideal source and even provide new and unique tastes a bit like nuts, a bit like vanilla, a bit like sweet potatoes and has a floral taste, to a very pleasant flavor perfect for ice cream (Fort Collins, 2020).

Giant Swamp Taro (*Cyrtosperma chamissonis*) is primarily known as Pao, a native plant of the Philippines. Specifically, it is found in Bohol especially in swampy coastal areas. In the province, Giant Swamp Taro are not given much value as foods, it is only eaten when nothing can be consumed anymore, when there is still other food to eat Giant Swamp Taro is forgotten. In order to promote Giant Swamp Taro, the researchers want to discover a food product using Giant Swamp Taro and process into mashed as the main ingredients in the production of the food stuff like dessert.

This encourage the researchers to create a dessert item made of Giant Swamp Taro, because they believed that there is enough supply of Giant Swamp Taro since in the eastern part of Bohol, around 15 hectares are grown with Giant

Swamp Taro. As such, the researchers ventured to produce ice cream a type of dessert that is deliciously loved by kids utilizing Giant Swamp Taro mashed as the main ingredients.

The researcher believed that through this study the Giant Swamp Taro farmers will be aware of the usefulness of Giant Swamp Taro as a root crop and food ingredient and will not left this crop unconsumed or underestimate this crop by just using as food for hogs. The rural community can also get benefit because they can use the new recipe as new addition to their snack or dessert.

Literature Background

This study is supported by some legal bases. To increase the utilization of farm crops, the Crops Act of 2013 seeks to accelerate the growth and development of agriculture, enhance productivity and incomes of farmers and the rural population, improve investment climate and efficiency of agribusiness and develop agricultural crops as expert crops for purposes of promoting of the production of crops in suitable areas.

The Republic Act No. 7607, known as Empowering Small Hold Farmers in their Economic Endeavours 2013, where it primarily aims in realizing equitable distribution of benefits and opportunities through the empowerment of the small farmers. Furthermore, the law recognizes the countries responsibility for the welfare and development of small farmers by giving them support and attaining their socio-economic goals.

The Republic act No. 10068 which known as the organic agriculture act of 2015 mandated the development and promotion of the organic agriculture in the Philippines. It was declared as the policy of the state to promote, propagate, develop further and implement the practice of organic agriculture in the Philippines that will cumulatively condition and enrich the fertility of the soil, increases farm productivity.

Little is known of the nutritional needs of Giant Swamp Taro (*Cyrtosperma*), but it is known that the plant responds readily to composts and organic mulches. It is a large plant with a long crop duration, and its nutritional requirements may be high.

The Republic Act No. 10611, otherwise known as Food Safety Act 2013- an act that strengthen the food safety regulatory system in the country to protect consumer health and facilitate market access of local foods and food products, and for other purposes.

The following related literature provide background information about this study:

Giant Swamp Taro refers to any plant of genus *Cyrtosperma*, member to family *Araceae* and is a native plant of the Philippines that has dozens of varieties thriving on the most of the three tropical islands in the pacific (Hopkins, 2012). It is one of the few subsistence crops that grows well within swampy areas. The giant swamp taro can stay up 15 to 30 years in the ground and takes 2 to 4 years for the crop to fully mature when growth in pits on atolls as well as

longer to 5 to 8 years when in swamps on high island. The size varies with cultivar and age to 15 to 25 kilograms is common but it can weigh up to 90 kilograms or more in a 10 years old plant (Englberger et al., 2008).

The product utilizes raw agricultural material giant swamp taro that be converted to a safe healthy product. In addition, it will feed the government's employment and livelihood programs.

This study is supported on the Theory of Nutrition that assert that all life processes in the body are in a strong dependence of diet, and what constitutes for its food-since the very first day of the life. Every living organism in its life processes continuously spends some constituent substances. In addition, Giant swamp taro is used in traditional medicines in many of the low and high islands of Micronesia. The yellow mould from sun-dried corms sliced also used to treat skin infections. Giant swamp taro is a water-loving plant, which is well adapted to fresh to brackish water conditions in coastal marshes, natural and manmade swamps and pit depressions. The cultivation of giant swamp taro is limited to the swampy lowland regions of the world.

The main product of giant swamp taro is the corm which can be cooked, roasted, boiled, baked, mashed, grated and combine with other starches or ingredients for eating. It can be utilized as mashed giant swamp taro as the main ingredients to produce ice cream.

According to Dr. Mercola, (2020) giant swamp taro roots benefits come from its rich source of nutrients which include potassium, calcium, magnesium,

phosphorous, folate and fiber. It contains good amount of antioxidants as well as vitamins C, B and E. Perhaps the most standout quality of this root crop is high in fiber content. Further, giant swamp taro is a nutrient rich indigenous food that is essential of vitamin A that maybe promoted for health improvements. There are many *Cyrtosperma* cultivars but few have been analysed and attributes for carotenoids, lutein, zeaxanthin, lycopene and minerals including iron, zinc, and calcium (Journal of Food composition and Analysis, 2020).

Moreover, Giant swamp taro along with other local foods can protect against many serious diseases such as Vitamin A deficiency, anemia, diabetes, heart diseases and cancer. It is rich of mineral (zinc, calcium and iron), B-carotene, and fiber. Giant swamp taro is highly valued but consumption is infrequent. It can be eaten to replace other crops like bread fruit when not in season. It can with stand strong winds and hurricanes, thus providing food security (Englberger and Levendusky, 2004).

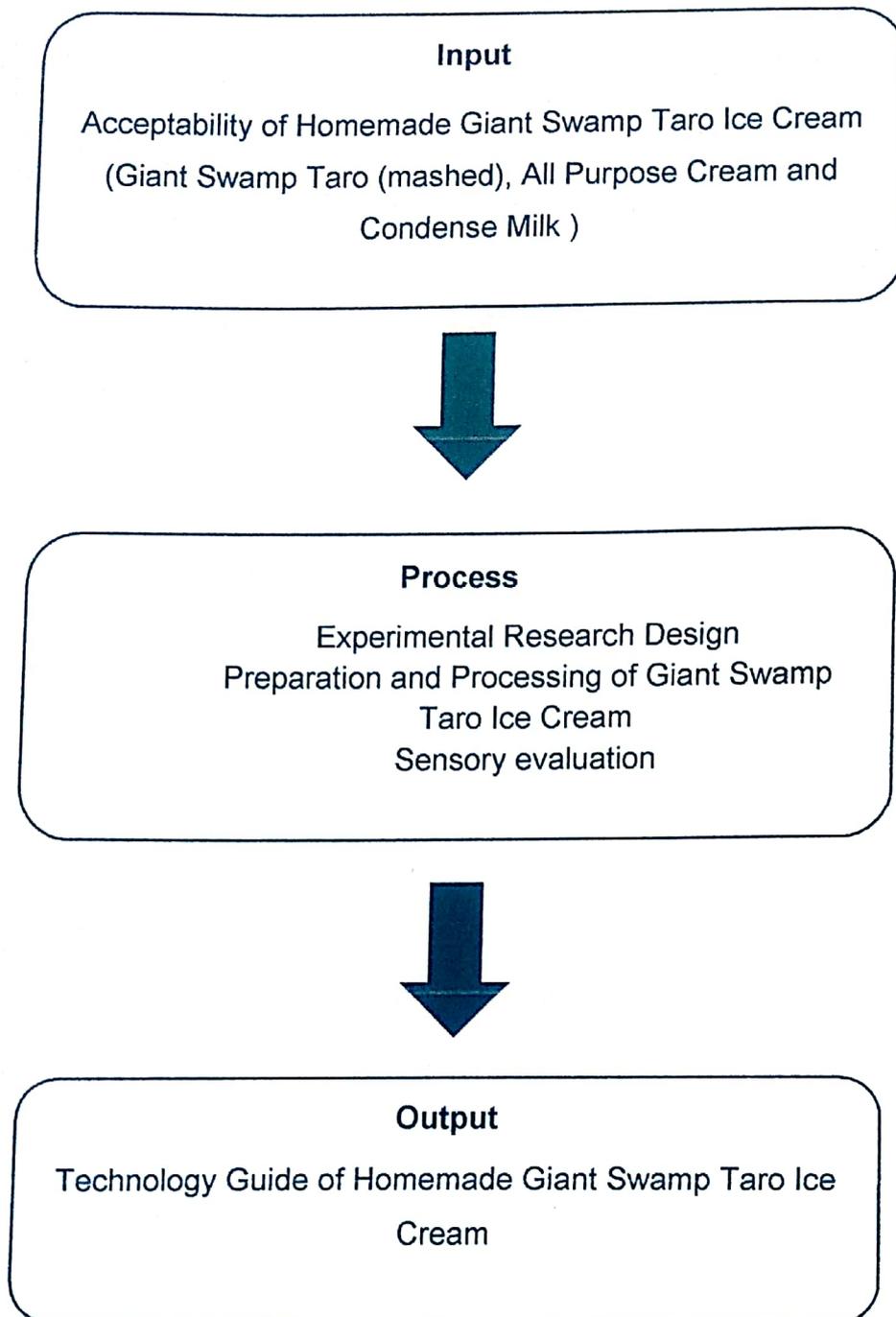


Figure 1. Flow of the Study

THE PROBLEM

Statement of the Problem

Generally, this study aimed to determine the sensory evaluation of the different treatments of Homemade Giant Swamp Taro (*Cyrtosperma chamissonis*) in ice cream making as a new product conducted at Bohol Island State University-Bilar Campus S.Y 2020-2021.

Specifically, it sought to answer the following questions:

1. What is the profile of the respondents in terms of:
 - 1.1 age;
 - 1.2 gender;
 - 1.3 civil status;
 - 1.4 educational attainment and
 - 1.5 occupation?
2. What is the sensory attributes level of Homemade Giant Swamp Taro Ice Cream in terms of the following sensory attributes:
 - 2.1 appearance;
 - 2.2 aroma;
 - 2.3 taste; and
 - 2.4 texture?
3. What is the visual quality assessment of the most acceptable treatment?
4. Is there a significant difference in the acceptability level of the ice cream in terms of their sensory attributes?

5. What technology guide can be proposed based on the result of the study?

Statement of Null Hypothesis

There is no significant difference of the four treatments of homemade giant swamp taro ice cream in terms of its sensory attributes and overall acceptability.

Significance of the study

The researchers believe that the findings of this study would be useful to the following:

Students. This study serves as a source of information in the utilization of giant swamp taro into their entrepreneurial activities.

Food Technology Teachers. The output of this study was give ideas to the teachers in making Giant Swamp Taro crop an ingredient in various cooking preparation.

Academe. The research outputs might be utilized by any school and universities as one of the variety of food products to be introduced in the area of food production and in the localities especially to the out-of-school youth and jobless people.

Future Researchers. The accomplishments of this research output would help future researchers in making related studies in utilizing crop that were underutilized in creating food products for further studies.

Farmers. The study was encouraging them to plant more giant swamp taro to add to their produce and income.

Entrepreneurs. The outputs will serve as a sample as product for income-generating opportunities and might become a way for more productive business in the future.

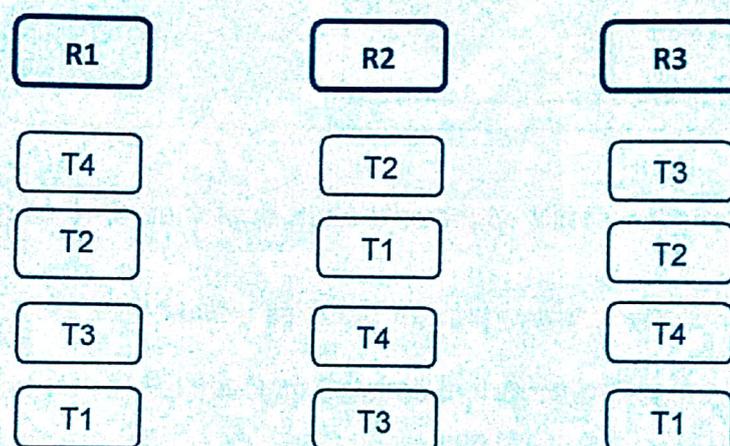
Consumers. The result of this study might be beneficial to the health and well-being of consumer's end-users because the food product may contain useful nutrients.

Department of Agriculture. The result of this research would help to promote the growth and development of agriculture, and might turn agricultural crops for purposes of promoting production, processing, marketing and distribution of crops in Bohol and the country.

RESEARCH METHODOLOGY

Research Design

The study employed the experimental research design utilizing the Completely Randomized Design (CRD) method of generating the data. The respondents were asked to answer a sensory evaluation tool to ascertain their sensory preferences as to aroma, appearance, taste and texture of the homemade giant swamp taro ice cream with the following replication and treatment.



Legend;

- T1 - 1 cup Mashed Taro + 1 cup Cream + 1 cup Condense Milk
- T2 - 1/4 cup Mashed Taro + 1 cup Cream + 1 cup Condense Milk
- T3 - 1/2 cup Mashed Taro + 1 cup Cream + 1 cup Condense Milk
- T4 - 3/4 cup Mashed Taro + 1 cup Cream + 1 cup Condense Milk

Figure 2. Experimental lay out using CRD

Environment and Participants

The study was conducted at Bohol Island State University - Bilar Campus situated at Zamora, Bilar, Bohol. The institution is an agricultural state university

that offers academic and vocational courses to improve the skills of the students. The study was conducted in the Food Technology Laboratory of the above-mentioned institution during the academic year 2020-2021.

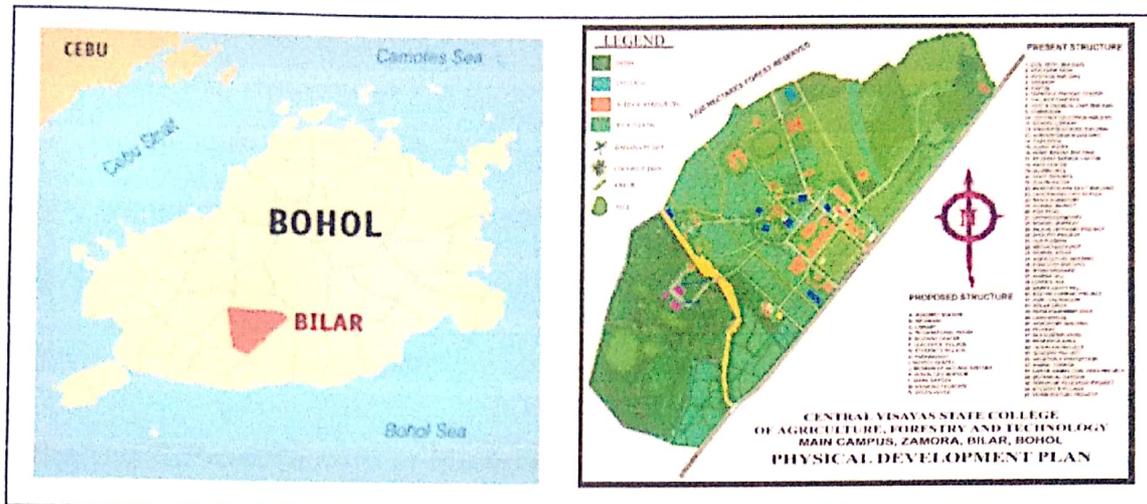


Figure 3. Bohol Island State University- Bilar Campus Map

The researchers purposively selected 40 respondents which composed of twenty-five (25) students of Bachelor of Science in Industrial Technology Major in Food Preparation Service Management; ten (10) students of Bachelor of Science in Hospitality Management II and five (5) faculties who are handling food related courses. They are chosen as participants because they are exposed in theory, as well as in the actual field of cooking.

Instrument

In gathering the data, the researcher utilized the modified 5-point hedonic scale questionnaire, a customized questionnaire with the numerical scale and corresponding description in (5) Extremely Like, (4) Very Like, (3) Neither Like,

(2) Very Dislike, (1) Extremely Dislike. The prepared questionnaire determined the acceptability level of the product based on the following attributes such as appearance, aroma, taste, and texture of the product.

Permit Acquisition

A permission letter was asked and start to undergo the research at BISU Bilar Campus with the notification of the Thesis Adviser, recommendation of Dean of the College of Technology and Allied Sciences and approval of the Campus Director of the school.

Gathering & Procurement of Materials:

In the preparation of homemade giant swamp taro ice cream needed are the following tools and equipment. They include the knife, chopping board, kettle, potato masher, blender, electric mixer, mixing bowl and food container. Basic tools, equipment and ingredients were gathered and check their utility to undergo the product formulation and preparation. The collection of giant swamp taro must observe its maturity, its condition and full characteristic of quality raw material.

Preparation of Giant Swamp Taro Ice Cream

Gather mature giant swamp taro crop, Wash the giant swamp taro thoroughly, peel the skin of the giant swamp taro to remove the unwanted soil of particle, Chop the giant swamp taro into small cuts. Cook the giant swamp taro until soft, Mash the cooked giant swamp taro, gather all the ingredients, tools and utensils needed, measure all the ingredients needed.

Peel the 500g giant swamp taro using knife and chop into small cubes. Cook the swamp taro for 1 hour or until it cooks moderately. After it cooked mashed the swamp taro using masher and then mix with 1 cup condensed milk into the blender then set aside. In a large bowl put 1 cup of all purpose cream and whip the cream using electric mixer at high speed until stiff peak form and then add the blended mixture to the cream whip again for 3 to 5 minutes and then put in plastic container and then freeze.

Several modifications in the processes were done as well as in the amount of the different measurement applied. Trial and error of the product were also utilized to suit the consumer taste preference and to ensure the acceptability of the product until the final product was formulated. Each treatment was subjected to a trial testing

Product Evaluation

The researchers spent ample time in preparing the Homemade Giant Swamp Taro Ice cream. The formulated products was subjected to food tasting. It was distributed to the respondent's by prepared set up. Each set up comprise of the different treatment as samples, pencil, bottled water. Place in a designated area and observed the one meter apart from each other to comply health protocol. Water was given to rinse their mouth before and after tasting each treatment so as not to alter the taste. After distributing the sample products, the questionnaire was given to the respondents for them to rate according to its acceptability. To ensure that the respondents would be able to answer the questions honestly, the researchers gave a clear instructions and enough time.

The respondents were able to taste each Homemade Giant Swamp Taro Ice cream at one time only.

Statistical Treatment of Data

The data gathered were tallied, tabulated, analysed and interpreted using percentage and one-way ANOVA to determine the significant difference among treatments.

The frequency counts and simple percentage formula were used to determine the demographic profile of respondents.

Secondly, weighted mean score formula was used to determine the acceptability level of homemade giant swamp taro in terms of appearance, aroma, taste and texture.

Then, One-way ANOVA was used to get the significant difference in the sensory evaluation of the homemade giant swamp taro ice cream in terms of their sensory attributes.

$$F = \frac{MST}{MSE}$$

$$MST = \frac{\sum_{i=1}^k (T_i^2/n_i) - G^2/n}{k-1}$$

$$MSE = \frac{\sum_{i=1}^k \sum_{j=1}^{n_i} Y_{ij}^2 - \sum_{i=1}^k (T_i^2/n_i)}{n-k}$$

Where F is the variance ratio for the overall test, MST is the mean square due to treatments/groups (between groups), MSE is the mean square due to error (within groups, residual mean square). Y_{ij} is an observation, T_i is a group

total, G is the grand total of all observations, n_i is the number of group I and n is the total number observations.

OPERATIONAL DEFINITION OF TERMS

The following are the definition of terms to understand the meaning of its term further to understand exactly what researchers are talking about when to refer something.

Acceptability. Refers to the quality of homemade giant swamp taro ice cream that is acceptable to the respondents.

Appearance. The featured quality of the giant swamp taro achieved through visual perception in different treatment.

Aroma. It pertains to the distinguish taste melting smell of homemade giant swamp taro ice cream.

Giant swamp taro (*Cyrtosperma chamissonis*). Refer to any of the several species of the genus *Cyrtosperma*, members of the family *Araceae*, the herbaceous crop contained the rhizomes or rootstocks which yielded an easy digested addible starch.

Complete Randomized Design. The like of research design used in the conduct of the study.

Homemade Giant Swamp Taro Ice Cream. Refer to the sweetened frozen food typically eaten consumed as a dessert. Prepared with the swamp taro as the main ingredient and a product of this study.

Masher. Kitchen Utensils used to mash Giant Swamp Taro.

Product Formulation. It refers to the process of putting together of ingredients in specific proportion in order to come up with the final formula of the homemade giant swamp taro ice cream.

Product Tasting. It is also termed as consumer tasting or a comparative tasting whereby it includes the process of measuring the properties or performance of homemade giant swamp taro ice cream in terms of appearance, taste and texture.

Taste. This refers to the pleasing palatability of food that conforms to one taste.

Chapter 2

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the presentation, analysis and interpretation of the data collected through the questionnaire answered by the 40 respondents which composed of the twenty-five students of BSIT-FPSM I and II and ten students of Hospitality Management II and five faculties who are handling food services course. The table illustrate the response on the problem of the study which determine the profile of the respondents in terms of age, sex, civil status, educational attainment and occupation. Moreover, the Sensory Evaluation of Homemade Giant Swamp Taro Ice Cream and the significant difference in the sensory evaluation level in terms of appearance, aroma, taste and mouthfeel. The study was conducted in the period of May to June 2021.

Table 1 shows the demographic profile of the respondents in terms of age, sex, civil status, educational attainment and occupation. Majority of the respondents the belongs to 20-25 (92.5%) age bracket and the lowest belong to the 44-49 (2.5%) age bracket. Out of forty (40) respondents 15 (37.5%) were males and 25 (62.5%) were females. With regards to the educational attainment college level got the highest percentage 92.5% (37). As for, occupation 92.5% (37) were students and 3 (7.5%) were teachers.

Table 1
Demographic Profile of the Respondents
n=40

	ITEMS	FREQUENCY	PERCENTAGE
AGE	20-25	37	92.5
	26-31	2	5
	32-37	0	0
	38-43	0	0
	44-49	1	2.5
TOTAL		40	100
SEX	Female	25	37.5
	Male	15	62.5
TOTAL		40	100
CIVIL STATUS	Single	38	95
	Married	2	5
TOTAL		40	100
EDUCATIONAL ATTAINMENT	College Level	37	92.5
	College Graduated		
	M.A	2	5
	College Graduated Ph.D.	1	2.5
TOTAL		40	100
OCCUPATION	Student	37	92.5
	Teacher	3	7.5
TOTAL		40	100

Table 2 displays the sensory evaluation of the homemade giant swamp taro ice cream in terms of appearance, aroma, taste and mouthfeel.

Data reveals that the sensory evaluation of the homemade giant swamp taro in terms of appearance reflected that majority of the respondents preferred T2 and got the highest rate of 4.23% described as "Extremely Like" while T1 with a weighted mean of 4.07% was described as "Very Like", T3 got the rate of 4.04% and described as "Very Like" and T4 with lowest the rate of 4.01% and

described as "Very like". Thus, this implied that T2 was the most favoured treatment with less amount of giant swamp taro.

In terms of aroma, T2 got the highest rate of 4.25% described as "Extremely Like", followed by T3 with a weighted mean of 4.14% described as "Very Like" and T1 with a rate of 4.08% described as "Very Like". And T4 with a lowest rate of 4.01% described as "Very Like". This implied that T2 was most acceptable by the respondents.

In terms of taste, T4 got the highest rate of 4.33% described as "Extremely Like" followed by T2 with a weighted mean of 4.30% described as "Extremely Like" followed by T1 with a rate of 4.07% described as "Very Like" and T3 with the lowest rate of 3.93% described as "Very Like".

Table 2 presented the result on sensory test in texture, T2 generated the highest rate of 4.09% followed by T3 with weighted mean of 3.96%. Then T4 with the rate of 3.90% and T1 with the rate of 3.89%, all treatments were described as "Very Like". This implied that the favoured treatment in terms of texture is T2.

To sum up the table 2, the overall acceptability of homemade giant swamp taro was obtained. The result showed that T2 got the highest weighted mean of 4.22% described as "Extremely Like". This implied that giant swamp taro ice cream, T2 was the most acceptable among the four treatments.

Table 2
Sensory Evaluation Level of Homemade Giant Swamp Taro Ice Cream

Sensory Attributes	T1		T2		T3		T4	
	WM	Description	WM	Description	WM	Description	WM	Description
Appearance	4.07	VERY LIKE	4.23	EXTREMELY LIKE	4.04	VERY LIKE	4.01	VERY LIKE
Aroma	4.08	VERY LIKE	4.25	EXTREMELY LIKE	4.14	VERY LIKE	4.01	VERY LIKE
Taste	4.07	VERY LIKE	4.30	EXTREMELY LIKE	3.93	VERY LIKE	4.33	EXTREMELY LIKE
Texture	3.89	VERY LIKE	4.09	VERY LIKE	3.96	VERY LIKE	3.90	VERY LIKE
Overall Acceptability	4.03	VERY LIKE	4.22	EXTREMELY LIKE	4.02	VERY LIKE	4.06	VERY LIKE

INDICATORS: Range

4.20 – 5.00
3.40 – 4.19
2.60 – 3.39
1.80 – 2.59
1.00 – 1.79

Description

- Extremely like (EL)
- Very like (VL)
- Neither Like (L)
- Dislike (DL)
- Never (N)

Legend

DI= Descriptive Interpretation

Table 3 showed the visual quality assessment of homemade giant swamp taro ice cream. The four different treatment were subjected to cool temperature storage and found out that no changes take place with the product even until the period of 19 days. This implies that T2 that composed of $\frac{1}{4}$ cup of mashed giant swamp taro added 1 cup of nestle cream and 1 cup of condensed milk can be a frozen product if stored at desired freezing temperature and further extend its good characteristics with ideal packaging materials storage.

Table 3
Visual Quality Assessment of Homemade Giant Swamp Taro Ice Cream

DAY	COOL TEMPERATURE			
	T1	T2	T3	T4
1	No Changes	No Changes	No Changes	No Changes
5	No Changes	No Changes	No Changes	No Changes
10	No Changes	No Changes	No Changes	No Changes
11	No Changes	No Changes	No Changes	No Changes
12	No Changes	No Changes	No Changes	No Changes
13	No Changes	No Changes	No Changes	No Changes
14	No Changes	No Changes	No Changes	No Changes
15	No Changes	No Changes	No Changes	No Changes
16	No Changes	No Changes	No Changes	No Changes
17	No Changes	No Changes	No Changes	No Changes
18	No Changes	No Changes	No Changes	No Changes
19	No Changes	No Changes	No Changes	No Changes

Table 4 the significant difference of homemade giant swamp taro ice cream in terms of the different sensory attributes.

Result showed that the appearance of homemade giant swamp taro ice cream obtained 0.260 which is not significant at 0.05 level of significance with df (3) and P-value of 0.853. This means that there is no significant difference in the appearance of homemade giant swamp taro ice cream, therefore the null hypothesis was accepted.

In terms of aroma, computed F-value is 0.887 which are significant at 0.05 level of significance with df (3) and P-value of 0.488. This means that there is no

significant difference in the aroma of homemade giant swamp taro ice cream, therefore the null hypothesis was accepted.

The result manifested the F-value obtained for taste is 0.764 which are significance at 0.05 level of significance with df (3) and P-value of 0.545. This means that there is no significant difference in the taste of homemade giant swamp taro ice cream, therefore the null hypothesis was accepted.

For the texture, the F-value 0.809 which are significant at 0.05 level of significance with df (3) and P-value of 0.524. This means that there is no significant difference in the texture of homemade giant swamp taro ice cream, therefore the null hypothesis was accepted.

Table 4
Difference in the Sensory Evaluation Level of Homemade Giant Swamp Taro Ice cream in terms of sensory attributes



	Sum of Squares	Df	Mean Square	F	p-value	Description
Appearance	0.083	3	0.028	0.260	0.853	Not Significant
Aroma	0.102	3	0.034	0.887	0.488	Not Significant
Taste	0.326	3	0.109	0.764	0.545	Not Significant
Texture	0.069	3	0.023	0.809	0.524	Not Significant

*Significant at $p < 0.05$

Chapter 3

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter deals with the summary of the study, discussion of the findings, the conclusions drawn and recommendations made as an outgrowth of this study based on the gathered data, which were analysed and interpreted in the preceding chapter.

Summary of Findings

The study was conducted at the Bohol Island State University, Bilar-Campus Zamora, Bilar, Bohol in the period of May to June 2021. The main purpose of the study was to determine the acceptability level of homemade giant swamp taro ice cream. Specifically, this sought to find out the profile of the respondents in terms of age, gender, civil status, educational attainment and occupation. The best way in making homemade giant swamp taro ice cream was ideally combination with mashed giant swamp taro, cream and condensed milk. The acceptability level of homemade giant swamp taro ice cream in terms of appearance, aroma, taste and texture, visual assessment of the giant swamp taro ice cream and the significant difference among treatments also were determined. There were 40 respondents of the study. During the product taste testing the respondents were given a questionnaire to be filled up. Most of their feedbacks considered T2 as the most preferred or accepted in all the treatments. On the other hand, the product was nutritious and applicable for entrepreneurial

activity. Based on the result there was no significant difference among treatments.

Conclusion

Based on the findings of the study, the researchers arrived at the following conclusions.

It was revealed that the analysis of the acceptability of homemade giant swamp taro ice cream in terms of appearance, aroma, taste and texture of the four treatment revealed that there was no significant difference at 5% level so the null hypothesis was accepted.

It was also found out that the more giant swamp taro ingredients added the taste increasingly delicious and, nutritious as well. Thus, beneficial to the consumer.

In the visual quality assessment, it was found that the four treatment were still in good condition and no changes took place even within the period of 19 days.

Recommendations

Based on the conclusions, the researcher came up with the following recommendations:

1. Future researchers are encouraged to conduct further studies using other methods of processing the giant swamp taro.

2. There should have a proper tool to mashed the swamp taro in order to have a smooth texture.
3. The fiber of the mashed giant swamp taro mashed will be utilized for some value of food products because it can be a rich source of fiber.
4. Farmers may consider producing more giants swamp taro to supply the need and demand of the products.
5. Food technology instructors may introduce the product as an additional recipe of food instruction and as a basis for teaching other giant swamp taro based products that can be a potential innovation to many income generating projects after the enhancement of its attributes.
6. Likewise, related studies to develop more products utilizing Giant Swamp Taro and other abundant resources in the locality may be conducted.

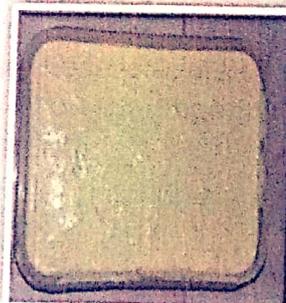
Technology Guide of Homemade Giant Swamp Taro (*Cyrtosperma
chamissonis*) Ice Cream



Republic of the Philippines
BOHOL ISLAND STATE UNIVERSITY – BILAR
Zamora, Bilar, Bohol

**Proposed Technology
Guide**

**Homemade Giant Swamp Taro
(*Cyrtosperma chamissonis*) Ice
Cream**



Rationale

Root crops are considered to be a good source of energy. A rare and less widely used root crop for consumption among Boholanos is giant swamp taro. This crop is known to be useful and had been proven for so many benefits. *Cyrtosperma chamissonis* or giant swamp taro, is a crop grown throughout Oceanic and into the south and southeast Asia. It is riverine and "swamp crop" similar to taro but with bigger leaves and larger coarser roots. There no demonstrably wild population today but it is to be native to Indonesia. It is known as puraka in Cook Island, lak in Yap, babai in Kiribati, pula'a in Samoa, vian kan in Fiji, pulaka in Tokelau and Tuvalu, simiden in Chuuk, swamp taro in Papua New Guinea, navaia in Vanuata and Palawan in the Philippines.

Giant Swamp Taro "*Cyrtosperma chamissonis*" is a locally term as "Pao" in Visayan. The crop is known to be made as ingredients in cooking because of its inherent functions as food ingredients. To level up the today's economic situation with the recent trend of food technology, giant swamp taro is used and cooked as an ice cream for food production opportunities. Moreover, homemade giant swamp taro ice cream was created in order to serve as an evidence that the raw crops that we have locally can turn into good product that is new and useful, an innovation that maximize the crop's potential to the entrepreneur world.

C.2 Preparation of Giant Swamp Taro Ice Cream

1. Gather mature giant swamp taro corp.



2. Wash the giant swamp taro thoroughly.



3. Remove giant swamp taro skin unwanted soil and particle.



4. Chop the giant swamp taro into small cuts.



5. Cook the giant swamp taro until soft.



6. Mash the cooked giant swamp taro.



TECHNOLOGY GUIDE IN MAKING HOMEMADE GIANT SWAMP TARO ICE CREAM

Making Homemade Giant Swamp Taro Ice Cream needs the following ingredients tools and equipment observing the proven procedural steps.

A. Ingredients:



Giant Swamp Taro



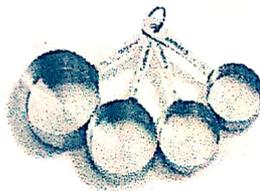
Cream

Condense Milk

B. Tools and Equipment:



Blender



Measuring Cups



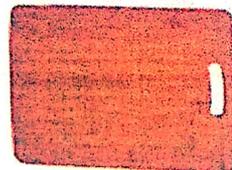
Mixer



Mixing bowl



Potato Masher



Chopping Board



Knife



Ice Cream Cup

C. Procedure

C.1 Preparation of ingredients and the tools of Homemade Giant Swamp Taro Ice Cream

1. Gather all the ingredients, tools and utensils needed.



2. Measure all the ingredients needed.



II. OBJECTIVES

The objectives of this proposed technology guide are the following:

- 1.To introduce Homemade Giant Swamp Taro Ice cream to the school and community;
- 2.To encourage the community to utilize locally available farm resources specifically giant swamp taro crops;
- 3.To prepare nutritious and money-wise ice cream product;
- 4.To guide the students in formulating food products particularly using giant swamp taro ice cream; and
- 5.To augment one's source of income for economic growth and prosperity;

C.3 Making of Homemade Giant Swamp Taro Ice Cream

1. Combine the mashed giant swamp taro and condense milk.



2. Blend the combined giant swamp taro and condense milk.



3. Whipping the cream until soft peak.



4. Add the combine condensed milk and mashed giant swamp taro into the cream.



5. Place the combined mashed giant swamp taro, condensed milk, cream into the ice cream cup.



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APPENDIX A
QUESTIONNAIRE



Republic of the Philippines
BOHOL ISLAND STATE UNIVERSITY
Bilar campus
Zamora, Bilar, Bohol



College of Technology and Allied Sciences

Vision: A premier S & T university for the formation of a world class and virtuous human resources for sustainable development in Bohol and the country.

Mission: BISU is committed of quality higher education in the arts and sciences, as well as in professional and technological fields; undertake research and development and extension services for sustainable development of Bohol and the country.

Modified 5 Hedonic Scale on Evaluating Acceptability of Homemade Giant Swamp Taro (*Cyrtosperma chamissonis*) Ice Cream: A Proposed Technology Guide

I. Profile of respondent

Age: _____ Sex: _____ Civil status: _____

Highest Educational Attainment: _____ Occupation: _____

II. Direction: Please read the following items in the table and put the check mark (/). In order to gather information for the study.

TREATMENT 1

Sensory Preference	Extremely like (5)	Very like (4)	Neither Like (3)	Dislike (2)	Extremely dislike (1)
Appearance					
Aroma					
Taste					
Texture					

TREATMENT 2

Sensory Preference	Extremely like (5)	Very like (4)	Neither Like (3)	Dislike (2)	Extremely dislike (1)
Appearance					
Aroma					
Taste					
Texture					

TREATMENT 3

Sensory Preference	Extremely like (5)	Very like (4)	Neither Like (3)	Dislike (2)	Extremely dislike (1)
Appearance					
Aroma					
Taste					
Texture					

TREATMENT 4

Sensory Preference	Extremely like (5)	Very like (4)	Neither Like (3)	Dislike (2)	Extremely dislike (1)
Appearance					
Aroma					
Taste					
Texture					

Legend

- 5= Extremely like. The product is good in appearance, aroma, taste, and texture,
 4= Very like. The product is almost perfect
 3= Neither Like. You like the product but you feel like there is something lacking
 2= Dislike. You don't like the product
 1= Extremely dislike. The product is awful and unacceptable

APPENDIX B
LETTER REQUEST



Republic of the Philippines
BOHOL ISLAND STATE UNIVERSITY
Bilar campus
Zamora, Bilar, Bohol



College of Technology and Allied Sciences

April 7, 2021

MARIETTA C. MACALOLOT, Ph.D.
Campus Director
BISU-Bilar Campus

Warm Greetings!

In partial fulfillment of the requirements of Bachelor in Science of Industrial Technology major in Food Preparation Service Management, we the students in the subject Research 2 in the S.Y. 2021-2022 conducted a research entitled "**ACCEPTABILITY OF HOMEMADE GIANT SWAMP TARO (*Cyrtosperma chamissonis*) ICE CREAM**".

In this regards we would like to ask permissions from your humble office to allow us to distribute and to gather the data necessary in this study. We the researcher assures that these undertakings will follow the health protocols set upon by the university in the distribution and retrieval of the data for safety purposes for both parties.

We would greatly appreciate your consent about this request.

Very truly yours,

(Sgd) Genesel P. Anunciado
(Sgd) Rogelio P. Jagutin J.r
(Sgd) Jovelyn C. Mejorada
(Sgd) Mary Jane G. Daverao
Researchers

Noted by:

(Sgd) JENEVEB D. ECAT
Thesis Adviser

Recommending Approval:

(Sgd) ARLEN B. GUDMALIN, Ph.D.
Dean, CTAS

Approved by:

(Sgd) MARIETTA C. MACALOLOT, PhD
Campus Director

APPENDIX C Giant Swamp Taro Crop and its Processed Product



Homemade Giant Swamp Taro Ice Cream ready for Tasting

APPENDIX D

Computation of the One Way Analysis of Variance

Appearance

Groups	Count	Sum	Average	Variance
T1	40	162.68	4.067	0.149077949
T2	40	169.02	4.2255	0.167625385
T3	40	161.67	4.04175	0.171609679
T4	40	160.33	4.00825	0.122045577

ANOVA

Source of Variation	Sum of squares	df	Mean Square	F	P-value	F crit
Between Group	1.112952	3	0.370984	2.431253843	0.0672349	2.662568549
Within Groups	23.80399	156	0.15259			
Total	24.91694	159				

Aroma

Groups	Count	Sum	Average	Variance
T1	40	163.35	4.08375	0.18050609
T2	40	170.01	4.25025	0.168997372
T3	40	165.67	4.14175	0.141450705
T4	40	160.34	4.0085	0.179592564

ANOVA

Source of Variation	Sum of Squares	Df	Mean Square	F	P-value	F crit
Between Groups	1.247197	3	0.415732	2.47996014	0.06317720	2.66256854
Within Groups	26.15132	156	0.16763	4	1	9
Total	27.39852	159				

Taste

Groups	Count	Sum	Average	Variance
T1	40	162.99	4.07475	0.184933269
T2	40	172.02	4.3005	0.118958718
T3	40	157.34	3.9335	0.194674615
T4	40	173.36	4.334	0.193968205

ANOVA

Source of Variation	Sum of squares	f	Mean Square	F	P-value	F crit
Between Groups	4.34336687	3	1.447789	8.362259585	3.43638E-05	2.662568549
Within Groups	27.0088575	156	0.173134			
Total	31.3522244	159				

Texture

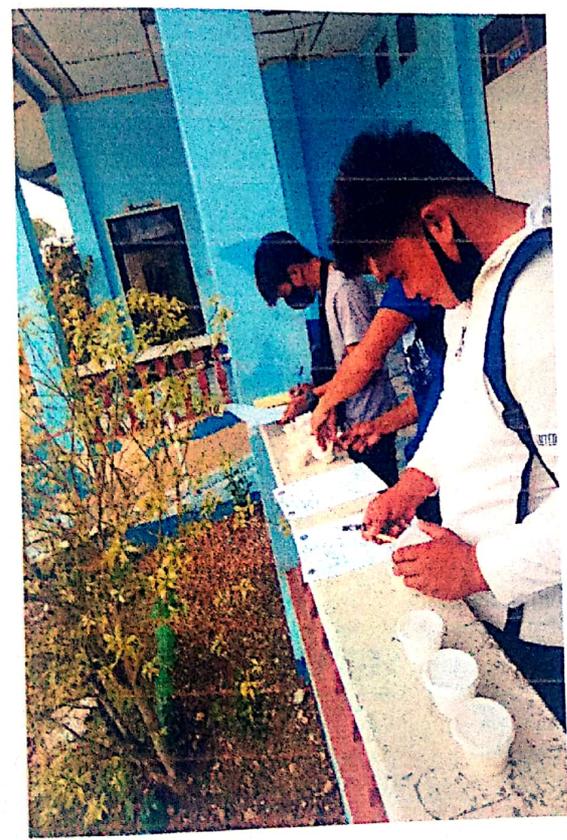
Groups	Count	Sum	Average	Variance
T1	40	155.72	3.893	0.110031795
T2	40	163.65	4.09125	0.176708654
T3	40	158.36	3.959	0.201132308
T4	40	156	3.9	0.326046154

ANOVA

Source of Variation	Sum of squares	df	Mean Square	F	P-value	F crit
Between Groups	1.012557	3	0.337519	1.658735061	0.178196039	2.662568549
Within Groups	31.74284	156	0.20348			
Total	32.75539	159				

APPENDIX E

Photo Documentation





Product Tasting

APPENDIX F

RAW DATA

APPEARANCE																
RN	T1				T2				T3				T4			
	R1	R2	R3	AVERAGE												
1	5	4	4	4.33	5	5	4	4.67	5	4	4	4.33	5	5	3	4.33
2	5	4	3	4	4	4	4	4	5	5	5	5	5	4	3	4
3	5	4	4	4.33	5	5	4	4.67	5	4	4	4.33	5	4	3	4
4	3	4	5	4	4	5	4	4.33	3	4	4	3.67	4	4	4	4
5	5	4	5	4.67	4	5	5	4.67	5	4	5	4.67	4	5	3	4
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18	4	4	4	4	4	5	4	4.33	4	4	3	3.67	4	4	5	4.33
19	4	4	4	4	4	4	4	4	4	4	3	3.67	4	4	3	3.67
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39	5	5	4	4.67	5	5	4	4.67	5	5	3	4.33	5	5	3	4.33
40	3	5	5	4.33	5	5	5	5	3	4	3	3.33	5	5	4	4.67

AROMA																
RN	T1				T2				T3				T4			
	R1	R2	R3	AVERAGE												
1	5	4	3	4	5	4	3	4	4	5	3	4	5	4	5	4.67
2	5	5	4	4.67	3	4	4	3.67	3	4	5	4	5	5	3	4.33
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14	4	4	5	4.33	4	5	5	4.67	3	4	4	3.67	4	4	3	3.67
15	4	4	5	4.33	4	5	5	4.67	3	4	4	3.67	4	4	3	3.67
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18	5	4	3	4	3	5	4	4	4	3	4	3.67	3	4	3	3.33
19	5	5	4	4.67	4	5	5	4.67	4	4	5	4.33	4	4	5	4.33
20	4	4	3	3.67	4	5	4	4.33	4	5	4	4.33	4	3	5	4
21	4	4	3	3.67	4	5	4	4.33	4	5	3	4	4	3	4	3.67
22	4	3	4	3.67	5	3	3	3.67	4	5	3	4	4	3	4	3.67

21	4	4	5	4.33	4	5	5	4.67	4	3	4	3.67	4	3	5	4
22	3	4	4	3.67	4	4	3	3.67	4	4	5	4.33	4	4	3	3.67
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28	5	5	3	4.33	5	5	3	4.33	5	4	5	4.67	5	3	3	3.67
29	5	4	4	4.33	5	5	4	4.67	5	4	3	4	5	4	5	4.67
30	4	2	5	3.67	4	3	5	4	4	5	4	4.33	4	5	4	4.33
31	4	5	4	4.33	5	5	4	4.67	4	5	5	4.67	3	5	5	4.33
32	3	5	4	4	5	5	4	4.67	5	5	4	4.67	5	4	5	4.67
33	5	3	3	3.67	5	5	3	4.33	5	5	3	4.33	3	3	4	3.33
34	5	5	3	4.33	5	5	5	5	5	5	5	5	5	3	3	3.67
35	4	4	5	4.33	4	5	5	4.67	4	5	5	4.67	4	3	5	4
36	4	4	4	4	4	5	3	4	4	5	3	4	5	5	4	4.67
37	5	5	3	4.33	4	5	4	4.33	4	5	4	4.33	5	5	3	4.33
38	3	5	5	4.33	3	4	4	3.67	3	4	4	3.67	3	4	3	3.33
39	4	4	4	4	4	4	5	4.33	4	4	5	4.33	5	5	4	4.67
40	4	4	3	4.67	4	4	3	3.67	4	4	3	3.67	5	5	3	4.33

TASTE

RN	T1				T2				T3				T4			
	R1	R2	R3	AVERAGE												
1	5	4	4	4.33	5	4	4	4.33	5	4	4	4.33	5	4	5	4.67
2	4	5	4	4.33	5	4	3	4	5	4	5	4.67	5	4	5	4.67
3	5	3	3	3.67	5	5	4	4.67	5	4	5	4.67	5	3	5	4.33
4	4	3	5	4	5	4	4	4.33	4	4	4	4	4	3	5	4
5	5	3	3	3.67	5	4	5	4.67	4	3	3	3.33	3	4	4	3.67
6	3	4	3	3.33	5	5	5	5	3	5	4	4	5	5	5	5
7	4	5	4	4.33	5	5	3	4.33	5	5	4	4.67	5	5	5	5
8	4	3	4	3.67	4	5	4	4.33	4	4	3	3.67	4	4	4	4
9	4	3	4	3.67	5	4	3	4	4	5	3	4	5	3	5	4.33
10	2	4	4	3.33	4	4	3	3.67	3	4	5	4	3	4	4	3.67
11	5	3	5	4.33	5	5	3	4.33	5	3	4	4	3	3	5	3.67
12	4	5	3	4	5	5	4	4.67	4	5	4	4.33	4	4	5	4.33
13	5	5	4	4.67	5	5	4	4.67	5	5	3	4.33	5	5	4	4.67
14	4	3	3	3.33	3	4	5	4	4	3	3	3.33	3	3	4	3.33
15	4	3	3	3.33	3	4	5	4	4	3	3	3.33	3	3	4	3.33
16	4	3	3	3.33	3	4	5	4	4	3	3	3.33	3	3	4	3.33
17	4	3	3	3.33	3	4	5	4	4	3	3	3.33	3	3	4	3.33
18	4	3	3	3.33	3	4	5	4	4	3	3	3.33	3	3	4	3.33
19	4	3	3	3.33	3	4	5	4	4	3	3	3.33	3	3	4	3.33
20	4	3	3	3.33	3	4	5	4	4	3	3	3.33	3	3	4	3.33

21	5	5	4	4.67	4	5	4	4.33	5	4	3	4	5	4	5	4.67
22	4	3	5	4	4	4	3	3.67	4	3	3	3.33	5	3	5	4.33
23	4	4	5	4.33	4	5	4	4.33	3	5	4	4	4	5	4	4.33
24	4	5	4	4.33	5	5	4	4.67	5	5	3	4.33	3	5	5	4.33
25	5	4	3	4	4	4	4	4	4	4	4	4	5	3	5	4.33
26	4	5	4	4.33	5	4	3	4	4	4	3	3.67	5	4	5	4.67
27	5	5	3	4.33	5	5	4	4.67	4	4	3	3.67	5	4	5	4.67
28	5	5	3	4.33	5	5	4	4.67	5	4	4	4.33	5	5	4	4.67
29	5	5	4	4.67	5	5	4	4.67	4	5	3	4	5	5	4	4.67
30	5	2	4	3.67	5	3	4	4	5	4	3	4	5	5	5	5
31	4	5	3	4	5	5	3	4.33	4	4	3	3.67	4	5	4	4.33
32	5	5	3	4.33	5	5	4	4.67	4	4	2	3.33	4	4	4	4
33	3	3	4	3.33	5	5	4	4.67	4	3	5	4	4	3	5	4
34	5	3	5	4.33	4	5	3	4	5	4	4	4.33	5	4	5	4.67
35	3	4	4	3.67	5	5	3	4.33	5	4	3	4	4	3	5	4
36	5	4	4	4.33	5	5	3	4.33	5	3	3	3.67	5	4	5	4.67
37	5	5	4	4.67	4	3	5	4	5	3	3	3.67	5	3	4	4
38	3	5	3	3.67	5	3	4	4	4	4	3	3.67	4	4	5	4.33
39	5	4	2	3.67	3	4	5	4	4	4	3	3.67	5	4	4	4.33
40	4	4	4	4	4	4	4	4	3	4	3	3.33	5	5	5	5

TEXTURE																
RN	T1				T2				T3				T4			
	R1	R2	R3	AVERAGE												
1	5	4	3	4	5	4	3	4	5	4	3	4	5	4	4	4.33
2	4	4	4	4	4	4	3	3.67	3	4	4	4	5	4	3	4
3	5	3	5	4.33	5	4	4	4.33	5	4	5	4.67	5	3	5	4.33
4	4	3	4	3.67	4	4	4	4	4	4	3	3.67	4	3	4	3.67
5	5	3	3	3.67	4	4	5	4.33	5	3	3	3.67	3	3	3	3
6	3	4	5	4	4	5	5	4.67	4	4	4	4	3	5	4	4
7	4	5	5	4.67	5	4	3	4	5	5	4	4.67	5	4	5	4.67
8	4	3	4	3.67	4	5	4	4.33	5	4	5	4.67	4	3	5	4
9	5	3	3	3.67	4	4	5	4.33	3	4	5	4	4	3	3	3.33
10	2	4	5	3.67	4	4	5	4.33	3	4	3	3.33	3	4	4	3.67
11	3	3	4	3.33	3	5	4	4	5	3	3	3.67	5	3	4	4
12	2	5	5	4	5	4	3	4	4	4	4	4	5	4	4	4.33
13	3	5	3	3.67	5	4	5	4.67	5	4	4	4.33	4	3	3	3.33
14	3	3	4	3.33	2	4	5	3.67	2	3	5	3.33	4	4	3	3.67
15	5	3	5	4.33	5	4	3	4	5	4	5	4.67	5	4	5	4.67
16	5	4	3	4	5	5	3	4.33	5	4	5	4.67	5	4	5	4.67
17	5	3	3	3.67	5	4	4	4.33	4	4	4	4	3	3	3	3
18	4	4	4	4	4	4	4	4	3	4	3	3.33	4	4	3	4
19	3	4	4	3.67	3	4	4	4	3	4	4	3.67	3	3	4	3.33
20	3	3	5	3.67	3	4	3	3.33	3	4	3	3.33	3	3	3	3

21	5	4	4	3.67	3	4	5	4	4	4	5	3.33	5	4	4	4.33
22	5	3	3	3.67	5	3	5	4.33	5	4	3	4	5	4	5	4.67
23	2	4	5	3.67	2	4	3	3	3	4	4	3.67	2	4	5	3.67
24	4	4	5	4.33	4	4	4	4	5	4	5	4.67	3	4	4	3.67
25	5	3	3	3.67	4	4	4	4	4	3	5	4	5	4	3	4
26	4	4	4	4	4	4	3	3.67	4	3	4	3.67	5	4	4	4.33
27	4	3	5	4	5	5	5	5	4	4	3	3.67	5	4	3	4
28	5	4	3	4	3	5	4	4	3	3	4	3.33	5	4	4	4.33
29	4	4	4	4	5	5	4	4.67	4	5	3	4	5	5	3	4.33
30	5	2	5	4	4	3	3	3.33	4	4	5	4.33	5	5	5	5
31	4	4	3	3.67	5	5	3	4.33	4	4	4	4	3	4	4	3.67
32	4	4	3	3.67	4	5	3	4	4	4	4	4	4	4	4	4
33	4	3	4	3.67	4	5	3	4	3	4	4	3.67	3	3	3	3
34	4	4	3	3.67	5	5	4	4.67	5	3	3	3.67	4	3	5	4
35	3	4	4	3.67	4	5	5	4.67	4	4	3	3.67	3	3	3	3
36	4	4	3	3.67	4	5	3	4	4	3	5	4	4	2	3	3
37	5	5	4	4.67	4	5	4	4.33	5	5	5	5	5	4	4	4.33
38	5	5	3	4.33	3	5	5	4.33	3	5	4	4	2	4	3	3
39	5	4	5	4.67	3	4	3	3.33	4	4	3	3.67	5	4	5	4.67
40	3	5	4	4	4	4	3	3.67	3	5	5	4.33	4	4	4	4

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Mother : Calixta Mejorada



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