

**SENSORY EVALUATION ON THE DIFFERENT LEVEL OF MELINJO  
(Gnetum gnemon) IN ICE CREAM PRODUCTION**

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

**GINA LOU G. BATAUSA  
JONNABELL M. CRUZA  
ARLENE JADE A. PERIDO  
ALBEN D. SUAREZ**

**June 2021**

SENSORY EVALUATION ON THE DIFFERENT LEVEL OF MELINJO  
(*Gnetum gnemon*) IN ICE CREAM PRODUCTION

---

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

---

In Partial Fulfillment  
Of the Requirements for the  
Bachelor of Science in Industrial Technology major in  
Food Preparation Service Management 3

---

Batausa, Gina Lou G.  
Cruza, Jonnabell M.  
Perido, Arlene Jade A.  
Suarez, Alben D.

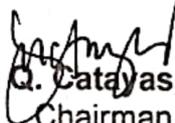
June 2021

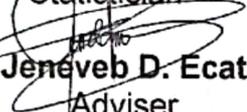


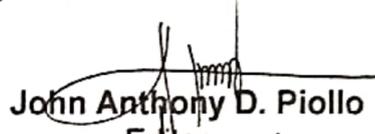
## APPROVAL SHEET

This thesis entitled "**Sensory Evaluation on the Different Level of Melinjo (*Gnetum gnemon*) in Ice Cream Production**" prepared and submitted by Gina Lou G. Batausa, Jonnabell M. Cruza, Arlene Jade A. Perido and Alben D. Suarez in Partial fulfillment of the requirements for the degree of Bachelor of Science in Industrial Technology major in Food Preparation Service Management has been examined and recommended for acceptance and approval for oral defense.

### THESIS COMMITTEE

  
Nelia Q. Cataylas, Ph. D.  
Chairman

  
Herbert Piollo  
Statistician  
  
Jenevib D. Ecat  
Adviser

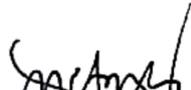
  
John Anthony D. Piollo  
Editor  
  
Kevin B. Gasatan  
Thesis Expert

---

Approved by the Examining panel during the oral examination conducted on June 07, 2021 with the rating of 1.7.

### EXAMINING PANEL

  
Arlen B. Gudmalin, Ph D.  
Chairman

  
Nelia Q. Cataylas, Ph. D.  
Member

  
Kevin B. Gasatan  
Member

  
Herbert Piollo  
Member

  
Hershey Lou M. Cabig  
Member

Accepted and approved as partial fulfillment of the requirements for the degree of Bachelor of Science in Industrial Technology major in Food Preparation Service Management.

June 07, 2021  
Date of Oral Defense

  
MARIETTA C. MACALOLOT, Ph D.  
Campus Director

ISU-BILAP CAMPUS  
LIBRARY

## ACKNOWLEDGEMENT

This piece of work would not have been realized without those persons who engaged and showered inspiration to the researchers, thus the necessity to extend their sincerest gratitude, endless thanks and appreciation to the following;

First and foremost, to the **Almighty Father** for His bountiful blessings, strength and encouragement to face the difficulties, enlightenment, good health, knowledge, and unfailing Divine Guidance for making the completion of this work possible.

**Ms. Nelia Q. Catayas, Ph.D.**, Research Instructor, for giving her time, effort, suggestions and for sharing her brilliant ideas, professional guidance in doing this research;

**Ms. Jeneveb D. Ecat**, Thesis Adviser, for her kindness, valuable suggestions, moral support and guidance towards the improvement of this work;

**Mr. John Anthony D. Piollo**, Thesis Editor, for spending time, effort and patience in refining and correcting the manuscript for the final copies;

**Mr. Herbert Piollo**, Thesis Statistician, for his valuable time and support in the statistical expertise, analyzing and interpreting data;

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

**Mrs. Arlen B. Gumalin, Ph.D.**, Dean of the College of Technology and Allied Sciences, for her approval to conduct the study;

**Mr. Kevin Gasatan**, Thesis Expert, for his guidance, support and advice during the conduct of the study;

Whole hearted gratitude is given to the ever supportive and loving parents: **Renato M. Batausa and Gemma G. Batausa, Eleno R. Cruza and Susana B. Marzon, Ma. Flor A. Perido, Simeon A. Suarez and Mercidita D. Suarez** for the financial, moral and spiritual support; for setting the example of boundless energy; and for their never-ending encouragement, prayer and guidance that serve as our motivation and strength to keep going and for the courage to face all the difficulties and challenges in doing the study.

To all friends who gave encouragement, support and assistance to the researchers;

To the Bachelor of Science in Industrial Technology major in Food Preparation Service Management, Hospitality Management, High School students, Faculty and Staffs of BISU-Bilar, who were eager and honest in answering the questionnaire;

To the researcher's siblings, relatives, friends, classmates, teachers and everyone mentioned directly and indirectly, who were always at their side to give genuine advice, motivations, encouragements, assistance, love and prayers that inspired the researchers to pursue the study.

And to those persons who were not mentioned but contributed much for the success of the study, may God shower you more blessings and fill you with his unconditional love. Thank you once again!

JALOU, LANGLANG, JONNA, BEN

## ABSTRACT

The study was conducted at the Bohol Island State University- Bilar Campus, Zamora, Bilar, Bohol for the food preparation, tasting and answering of the questionnaire by the respondents. The study was conducted to determine the sensory evaluation on the different level of Melinjo in ice cream production. Specifically, it sought to find out the demographic profile of the respondents; the sensory evaluation on the different level of Melinjo Ice Cream Production in terms of appearance, aroma, mouth feel, taste and general sensory evaluation. It further evaluates the visual quality and find the significant difference among the treatments. The study used experimental design employing the modified 5 hedonic scale questionnaire as an instrument in gathering data provided to forty respondents consisting of ten (10) BSIT-FPSM Students, ten (10) BSHM Students, ten (10) Faculty and Staff and ten (10) High School Students who had a background and experience related in cooking to rate the sensory attributes. Furthermore, results showed that in terms of appearance, aroma, mouthfeel, taste and general sensory evaluation, T2 or 1/2 cup of Melinjo juice had the highest weighted mean scale with descriptive interpretation of "Highly Acceptable". The highest visual quality among the treatments was also T2. The analysis of variance showed no significant difference among the treatments. The null hypothesis was rejected. It is therefore, farmers and food producer may consider producing more Melinjo trees to supply the production of Melinjo ice cream. Production of the product should be introduced to both school and community as a means of an income generating activity. The techno guide should be introduced to promote the utilization of Melinjo in ice cream making and future research may conduct related studies to develop/innovate more products out of Melinjo plant.

## TABLE OF CONTENTS

|                                     | Page |
|-------------------------------------|------|
| TITLE PAGE .....                    | i    |
| APPROVAL SHEET .....                | ii   |
| ACKNOWLEDGEMENT .....               | iii  |
| ABSTRACT .....                      | vi   |
| TABLE OF CONTENTS .....             | xii  |
| LIST OF TABLES .....                | x    |
| LIST OF FIGURES .....               | xi   |
| <b>CHAPTER</b>                      |      |
| <b>I. THE PROBLEM AND ITS SCOPE</b> |      |
| Rationale .....                     | 1    |
| Literature Background .....         | 2    |
| Flow of the Study .....             | 7    |
| <b>THE PROBLEM</b>                  |      |
| Statement of the Problem .....      | 8    |
| Significance of the study .....     | 9    |
| <b>RESEARCH METHODOLOGY</b>         |      |
| Design .....                        | 11   |
| Environment .....                   | 12   |
| Participants .....                  | 13   |
| Instrument .....                    | 13   |
| Data collection .....               | 14   |
| Statistical Treatment .....         | 16   |

|             |  |           |
|-------------|--|-----------|
|             | <b>OPERATIONAL DEFINITION OF TERMS .....</b>               | <b>17</b> |
| <b>II.</b>  | <b>PRESENTATION AND ANALYSIS OF THE FINDINGS</b>           |           |
|             | Profile of the Respondents .....                           | 19        |
|             | Melinjo ice cream in Four Different Treatments .....       | 23        |
|             | Visual quality evaluation of Melinjo ice cream .....       | 24        |
|             | Post-hoc Analysis .....                                    | 26        |
| <b>III.</b> | <b>SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION</b> |           |
|             | Summary .....  | 28        |
|             | Findings .....   | 29        |
|             | Conclusions .....  | 30        |
|             | Recommendations .....                                      | 30        |
|             | Technology guide of Melinjo ice cream .....                | 31        |
|             | <b>REFERENCES .....</b>                                    | <b>32</b> |
|             | <b>APPENDICES</b>  |           |
|             | A. Letter .....  | 33        |
|             | C. Questionnaire .....                                     | 35        |
|             | D. Computation of the one- Analysis of Variance .....      | 38        |
|             | E. Documentation .....                                     | 41        |
|             | F. Raw Data .....  | 42        |
|             | <b>RESEARCHER'S BIODATA .....</b>                          | <b>47</b> |

## LIST OF TABLES

| Table |   | Page |
|-------|---|------|
| 1     | The demographic profile of the respondents .....  | 20   |
| 2     | Sensory Evaluation of melinjo ice cream in four treatments...   | 23   |
| 3     | Visual Quality Evaluation of melinjo ice cream .....  | 24   |
| 4     | Difference in the sensory evaluation of melinjo ice cream in terms of sensory attributes .....  | 25   |
| 5     | Comparison of post hoc analysis result in the sensory evaluation of melinjo ice cream in four treatments in terms of sensory attributes ..... | 27   |

## LIST OF FIGURES

| Figure |                                       | Page |
|--------|---------------------------------------|------|
| 1      | Flow of the study .....               | 7    |
| 2      | The experimental lay out of CRD ..... | 11   |
| 3      | Map of Bohol .....                    | 12   |

## Chapter 1

### THE PROBLEM AND ITS SCOPE

#### Rationale

Cold desserts are very demanding particularly during summer seasons, however not all consumers eat ice cream due to health-related problems like high blood pressure and diabetes. Hence, to make ice cream healthy, gratifying and suitable for any ages, this study innovates ice cream by utilizing healthy ingredients such as Melinjo leaves. Recently, there is a limited study conducted in ice creams using vegetable and fruit, so the researchers thought of producing ice cream from Melinjo.

Melinjo (*Gnetum gnemon*) is a bittersweet flavored, a species of tree in the family of Gnetaceae. The leaves are bronze colored and turn smooth shady green when full-fledged. The young leaves, inflorescence and fruits are comestible and used as one of the main ingredients mixed along with other leafy vegetable when cooking ginataan or tinunuan (coconut milk) and the law-oy or utan bisaya. It can also be prepared as a salad.

This study was conducted to determine what treatment is the most acceptable in terms of appearance, aroma, texture, taste, and general sensory evaluation of Melinjo for the purpose of improving the flavor of healthy ice cream and the highest shelf life of the most acceptable treatment. The output of this study was utilized as techno guide.

## Literature Background

The 1987 Constitution of the Republic of the Philippines, Article XII, Section 10 states that:

Science and Technology are essential for national development and progress. The state shall give priority to research and development, invention, innovation, and their utilization; and to science and technology education training and services. It shall support indigenous, appropriate, self-reliant scientific and technological capabilities, and their application to the country's productive systems and national life.

The study is anchored on this provision which emphasizes that researchers must be given priority in their researches for them to develop and innovate food product out of the underdeveloped or underutilized resources such as edible indigenous plant species and one of them is the utilization of young Melinjo leaves in ice cream making.

Article XIV, Section 12 of the Philippine Constitution states that:

The state shall promote the preferential use of Filipino labor, domestic materials and locally produced goods, and adopt measures that help make them competitive.

In this connection, the state shall give support to the foundation, organization and more activities in order to be more productive and economically well founded that will help to produce more goods and services to uplift the economic crises for the progress of the country.

As stated by the Republic Act no. 3720, an act to ensure the Safety and Purity of Foods and Cosmetics, and the Purity, Safety, Efficacy and Quality of Drugs and Devices being made available to the public, vesting the Bureau of Food and Drugs with Authority to administer and enforce the Laws pertaining thereto and for other purposes. (As Amended by Executive Order No. 175 dated May 22, 1987).

This act shall be known as the Food, Drug and Cosmetic Act". The stated policies as embodied in article II, section 15 of the 1987 constitution, that the state shall protect and promote the right to health of the people and instill health consciousness among them and in section 12, article XIII of the 1987 constitution, that the state establish and maintain an effective food and drug regulatory system and undertake suitable health manpower development and research, responsive to the country's health needs and problem are reiterated. (As amended by E.O. No. 175 dated May 22, 1987).

Article XIV, Section 12 of the Philippine Constitution states that:

The state shall promote the preferential use of Filipino labor, domestic materials and locally produced goods, and adopt measures that help make them competitive.

In this connection, the state shall give support to the foundation, organization and more activities in order to be more productive and economically well founded that will help to produce more goods and services to uplift the economic crises for the progress of the country. Therefore, the state shall protect and support the health of the people.

On the other hand, Melinjo (*Gnetum gnemon*) Tree is a native in the Philippines and can also be found in tropical Asian countries. It is locally called Banago but Boholanos prefer to call it "Bago". It is popular among vegetable lovers and those who love to cook especially its young shoots which in one of the main ingredients mixed along with other leafy vegetable when cooking ginataan or tinunuan (coconut milk) and the law-oy or utan bisaya. It can also be prepared

as a salad (Berto, 2021). *Gnetum gnemon* is the binomial name of Melinjo which is also called as Bago. This plant is commonly cultivated throughout the Aceh region and is regarded as a vegetable of high status. Its male strobili, young leaves and female strobilus are used as ingredients in traditional vegetable curry called kuah pliek. *Gnetum gnemon* is a multi-purpose tree species which is native to the Philippines. It can be a source of food, wood, and fiber. Because of its edible young shoot, the species is more popularly known in some upland areas as a vegetable crop (Baloch, E. 2011).

In addition, Melinjo trees are mostly found in the forest. It also thrives in dry and humid areas on secondary and primary forest at low and medium altitude (0 to 1,200 m asl). It grows best in areas with annual precipitation of 3,000 to 5,000 mm although it can also survive annual rainfall of only 750 to 1,000 mm. Melinjo is small to medium in size tree reaching a height of 10 to 15 m and a diameter up to 40 cm. Bole is cylindrical with numerous branches. Leaves are opposite variable in size and shape, 10 to 20 cm long and 4-7 cm wide, ovate oblong to lanceolate, dark green, shiny smooth and usually pointed at both ends. Inflorescence is borne on young shoots and older branches. Fruits are produced in small clusters, 2.3 to 3.5 cm long, oblong with smooth red skin. Melinjo leaves have prominent veining branches across the surface and are thin and crisp with slender, green stems. Melinjo leaves have a bitter taste which mellows to mild, sweet, and nutty flavor when cooked and has a soft, delicate texture. Seed is enclosed in fleshy covering about one mm thick (Mukul, 2020).

In recent studies, Melinjo leaves contain nutritional benefits that can be derived from eating the young shoots of this species. It can regulate body temperature and kidney function, promote healthy hair and skin and help regenerate cells and tissues. It is also rich in protein, fiber, copper, potassium, phosphorus, calcium, iron, vitamin A, antioxidants, zinc, manganese, and magnesium. The mentioned health functions considered the plant to be herb.

The leaves, flowers and seeds are used as ingredients in various dishes. Melinjo seeds are used to produce emping. Emping is available in the well-stocked Asian supermarket. Emping is one savory dish that is very popular and has a high economic value. Emping is a kind of cracker made from Melinjo, both made by flour first, as well as directly to the ground after roasting it first. Melinjo rind consists of two parts, the outer shell tends to soft, but the inside skin is hard. Good Emping made from high quality of Melinjo. Emping ready to be enjoyed after being fried, can be enjoyed as a snack, or additional food for varieties of Indonesia culinary, like Soto or Bakso.

The safety of melinjo seed extract (MSE) powder was assessed in an acute oral toxicity study, a 4-week repeated dose toxicity study, and in a micronucleus test in rats. In the acute and subchronic toxicity studies, the group administered the powder did not show any toxicologically significant MSE-related changes, compared with the control group. The no observed adverse effect level (NOAEL) was determined as 1000 mg/kg/day. A genotoxicity test (rat bone marrow micronucleus test) was negative for MSE powder at levels up to 4000 mg/kg/day.

These results might provide supportive evidence of safety of melinjo seeds, which has been used as food ingredients for a long time (Elsevier Ltd., 2014).

From the information above, researchers encouraged much to explore behind the Melinjo Trees especially the leaves and the seeds. In addition, the production of ice cream involves mixing the ingredients together. It is then homogenized a process that allows the distribution of fat into as many separate small fat. After homogenization there is a cooling and ageing process. The product is then frozen in a continuous freezer and air incorporation take place. When the ice cream leaves the continuous freezer at -5 degree celsius approximately 50% of the water frozen. The final process is hardening, which freezes out most of the water at -40 degree celsius.

Vegetable based ice creams are surely a healthier option. Ice cream contains milk, fat, and other components, such as proteins and carbohydrates. Milk whipping cream, and Melinjo juice are added during processing to enhance flavor, mouthfeel, appearance. Ice cream is over 50% water, from milk or other ingredients. Air is incorporated into the product, resulting in finely distributed air cells protected by a layer of fat bubbles. Although it is still under study that health will improve dramatically as you start biting into these vegetable based ice creams, but they are still way healthier than your regular ice cream. Thus, consumer may switch to this type of ice cream this summer season to give a boost to once health.

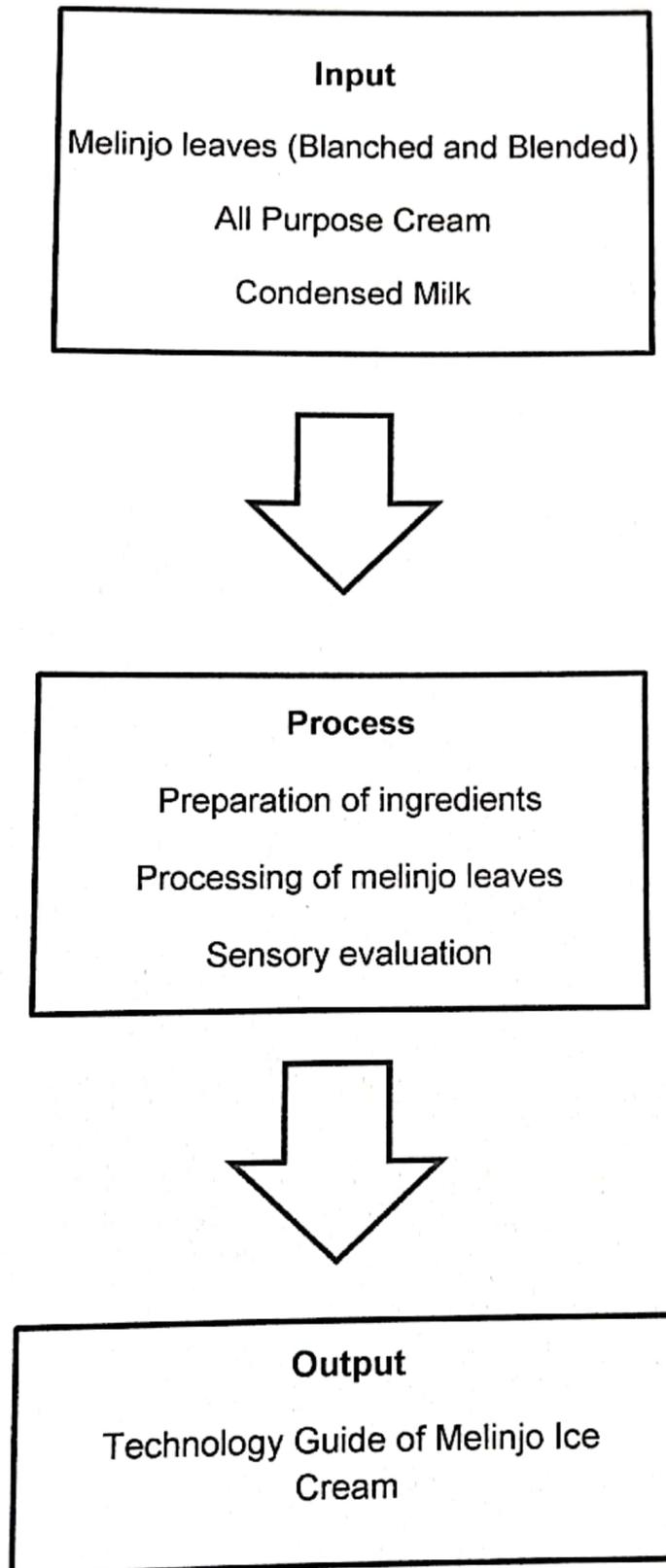


Figure 1: Flow of the Study

## THE PROBLEM

### Statement of the Problem

This study was conducted to determine the sensory evaluation on the different level of Melinjo in Ice Cream Production.

Specifically, it sought to answer the following questions:

1. What is the demographic 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 evaluation on the different level of Melinjo (*Gnetum gnemon*) in ice cream production in terms of the following sensory attribute;
  - 2.1 appearance;
  - 2.2 aroma;
  - 2.3 mouthfeel;
  - 2.4 taste and
  - 2.5 general sensory evaluation?

3. What is the result of the visual quality evaluation of the different level of Melinjo in ice cream production?
4. Is there a significant difference in the sensory evaluation on the different level of Melinjo in ice cream production in terms of the following sensory attributes?
5. What technology guide shall be offered base on the findings of the study?

### **Null Hypothesis**

There is no significant difference in the sensory evaluation on the different level of Melinjo (*Gnetum gnemon*) in ice cream production in terms of the following sensory attribute of the four treatments.

### **Significance of the study**

The result of the study would be of great benefit and useful to the following;

**Students.** This study would help the students become more aware of the importance and utility of Melinjo, as main ingredients for ice cream.

**Consumer.** The outcome of the study would be beneficial to the health and well-being of consumers and end-users. An option of choosing food product which is potentially nutritious, delicious and cheaper.

**Community.** The result of this study would encourage community folks to grow and produce more Melinjo that help for economically purpose.

**Entrepreneurs.** The output would serve as an innovated product for added revenue that gives them opportunities to gain income and further generate employment.

**Government.** The outcome would help to improve the health of the populace and economy of the country.

**Future Researcher.** This study would help future researchers to explore new product would serve as their reference.

## RESEARCH METHODOLOGY

### Design

The study utilized experimental type of research using the Complete Randomized Design (CRD) in generating the data. It was conducted to find out what treatment is the most acceptable in terms of appearance, aroma, mouthfeel, taste and general acceptability in a sensory evaluation. The respondents answered the sensory evaluation questionnaire as a tool to ascertain their sensory preferences of Melinjo ice cream with the following replications and treatments below.

The succeeding is the experimental lay out using Complete Randomize Design (CRD).

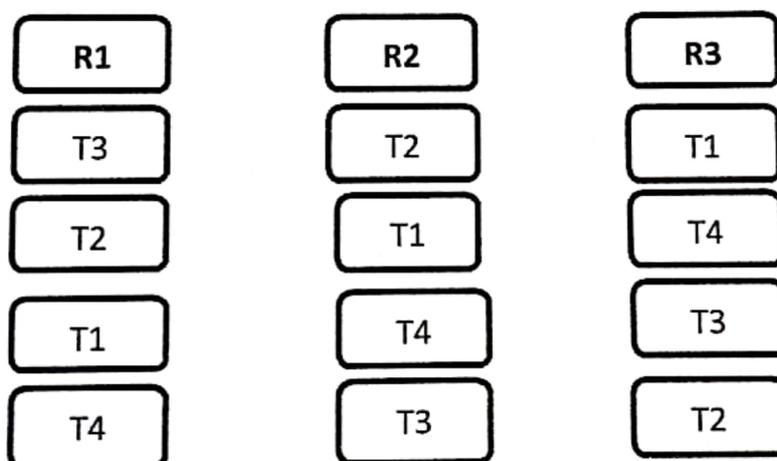


Figure 2: The experimental lay out of CRD

### Legend:

T1=  $\frac{1}{4}$  cup blended melinjo +  $\frac{1}{2}$  cup milk+ 1 cup all-purpose cream

T2=  $\frac{1}{2}$  cup blended melinjo+  $\frac{1}{2}$  cup milk + 1 cup all-purpose cream

T3=  $\frac{3}{4}$  cup blended melinjo+  $\frac{1}{2}$  cup milk + 1 cup all-purpose cream

T4= 1 cup blended melinjo+  $\frac{1}{2}$  cup milk + 1 cup all-purpose cream

## Environment

The study was conducted at Bohol Island State University- Bilar campus. This school is one of the leading satellites of BISU System, first ever established state university in the Island province of Bohol. This is the biggest campus in terms of land area with physical roads of 89.53 hectares utilized as farm field crops, crops and orchards, backyard and animal pasture, and miscellaneous purposes. This campus located at Zamora, Bilar, Bohol. It is found 23.9 km. away from Chocolate Hills and 8.1 km. away to Bilar Man-Made Forest. The researchers chose the institution as its researchers locale because the school offered the courses related to foods such as BSIT-FPSM, BSHM, Food processing, preparation and service in other college moreover, Faculty handling these course where competent and experts in the field. Thus, it is easy and convenient for the researchers to gather data.

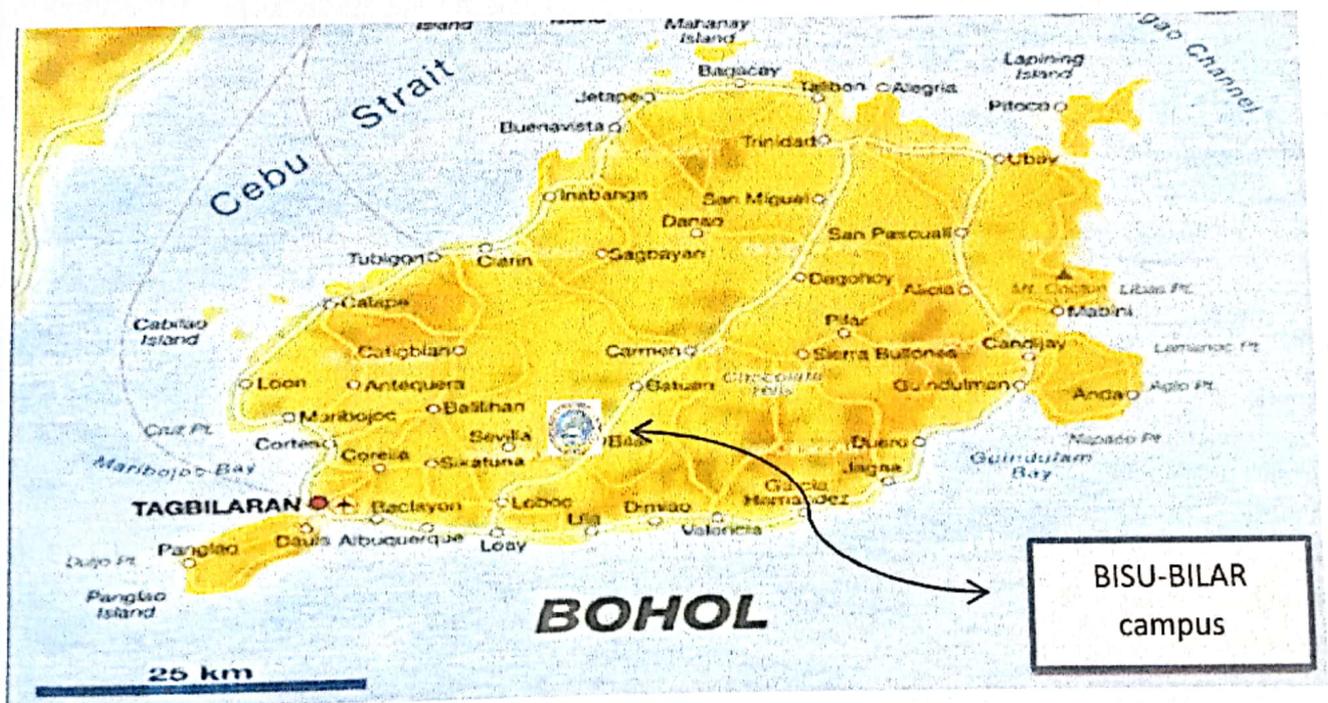


Figure 3: The map of bohol where the school is located.

## **Participants**

The research purposively selected 40 respondents which was composed of ten (10) students of Bachelor of Science in Industrial Technology Major in Food Preparation Service Management (BSIT-FPSM); ten (10) students Hospitality Management (HM); ten (10) faculty and staff who are handling food related courses and ten (10) High School students taking major in food preparation. The study greatly depends on the sincerity of the respondents in answering the questionnaire.

## **Instrument**

The researchers utilized the modified 5-points hedonic scale test, the customized questionnaire include the modification of numerical scale such as (5) Like Very Much, (4) Like Moderately, (3) Neither Like or Dislike, (2) Dislike Moderately, (1) Dislike Very Much. Sensory evaluation test and survey method was used by the researchers to evaluate the product. The study also evaluates the demographic profile of the respondents which include the age, gender, educational attainment and occupation. The survey questionnaire also evaluates the sensory attributes of the different treatment in terms of the acceptability level of the product.

## **Data Collection**

### **Securing permit for the Study**

The researchers made a letter address to Bohol Island State University-Bilar Campus asking permission to conduct the study. The letter was noted by the thesis adviser, recommended by Dean of College of Technology and Allied Sciences and approved by the Campus Director.

### **Gathering and Procurement of Materials**

The tools and equipment were checked properly to ensure its working efficacy before the researcher gathered to ensure the product formulation. The materials used of this study are owned by the researchers. The researchers used the following tools such as cauldron, blender, electric hand mixer, mixing bowl, measuring cup, rubber scraper, square bowl/food container, and freezer in the preparation of Melinjo ice cream.

### **Preparation of Melinjo Leaves**

The young leaves of Melinjo were washed properly before blanching. In the boiling water, the leaves were dipped for about 15-30 seconds then removed from the fire. Let the mixture cool then blend until it is already combined and becomes liquid.

## **Making the Melinjo Ice Cream**

In making Melinjo ice cream, the recipe followed using the measurements in every treatment. The ingredients were whipping cream, condensed milk and Melinjo juice. The Melinjo juice was refrigerated before mixing with whipping cream, Placed the bowl on an ice bath. Mix melinjo juice and whipping cream until thoroughly mixed using a whisk or a mixer until it get a stiff peak. Add the condense milk and continue mixing. Transfer in a square bowl and freeze overnight.

## **Data Gathering**

The researchers gathered the data following the health protocols. The treatments were distributed to the forty participants by batch. Ten participants at a time took the tasting to control the number of people inside the area. They were given a set up table with the four treatments and bottle of water. The researchers gave the respondents 10 to 15 minutes to answer the questionnaire based on their preference to the product given assured the respondent that their responses were kept and treated with the researcher's confidentiality.

## **Visual Quality Evaluation**

The four different treatments of Melinjo ice cream are further evaluated through its visual quality. Likewise, it would determine the storage period of the product. This would determine the product's appearance and color, during the process of evaluation.

## Statistical Treatment of Data

The data gathered were carefully tallied, tabulated, analyzed, computed and interpreted using weighted mean and one way ANOVA to determine the acceptability level of Melinjo ice cream and its significant difference among treatments for analysis.

### Formula for the One-Way ANOVA

$$F = \frac{MS_{\text{between}}}{MS_{\text{within}}}$$

One Way ANOVA: The one-way Analysis Of Variance (ANOVA) was used to determine whether there are significant differences between the means of two or more independent (unrelated) groups (although you tend to only see it used when there are a minimum of three, rather than two groups).

The computed weighted mean was described using the following scale with corresponding description:

- 4.2-5.0 - Highly Acceptable
- 3.4-4.1 - Moderate Acceptable
- 2.6-3.3 - Acceptable
- 1.8-2.0 - Less Acceptable
- 1.0-1.7- Not Acceptable

## Operational Definition of Terms

In order to have an easy and better understanding for the readers, the researchers define the following terminologies operationally;

**Acceptability.** It is the degree of acceptance of the food taste, aroma, texture, and the appearance of Melinjo Ice Cream.

**Appearance.** It refers to the physical presentation of the Melinjo Ice Cream.

**Aroma.** It is the olfactory state of sensory evaluation of Melinjo in Ice Cream production.

**Cream.** Thick part of the milk that rises to the top.

**Hedonic Scale.** A scale used to measure the sensory evaluation of the melinjo in ice cream production.

**Melinjo (*Gnetum gnemon*) leaves.** The flat, smooth, and shiny leaves are bronze when young and mature to a deep, glossy green. It is a native plant usually best suited for both raw and cooked application.

**Sensory Evaluation.** A scientific evaluation in the characteristics of foods and materials as they perceived by the senses.

**Sensory Attributes.** It refers to the respondents' judgment on the quality and the sensory evaluation of the Melinjo Ice Cream.

**Taste.** It is the sense by which the flavour or savour of the Melinjo Ice Cream as perceived when they are brought into contact with the tongue.

**Texture.** The visual or tactile surface characteristics and appearance of Melinjo Ice Cream.

## Chapter 2

### PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the presentation, analysis and Interpretation of data gathered from the forty (40) respondents to evaluate the Melinjo ice cream. The following tables presents the result of the study. The data gathered were tallied and presented in tabulated and textual form, analyzed and interpreted in the light of the relationship that exists among the variables as posed in this study.

#### **Profile of the respondents**

Table 1 presents the demographic profile of the respondents in terms of age, gender, educational attainment and occupation. Result shows that majority of the respondents were at the age bracket of 17-22 years old and got 55% rating, followed by the age bracket of 23-28 years old 29,17% and the percentage of 0.33% was obtain by the age bracket of 47-52 years old. In terms of gender, result reveals that highest percentage of 74.17% was obtain by female and the remaining 25.83% were male. Most of the respondents were college level (35%) and followed by faculty and staffs (25%). As to occupation, 79.17% were student while 20.83% were teachers.

Table 1: Demographic Profile of the Respondents

N=40

| Items                         | Frequency | Percent% |
|-------------------------------|-----------|----------|
| <b>Age</b>                    |           |          |
| 17-22                         | 24        | 55%      |
| 23-28                         | 9         | 29.17%   |
| 29-34                         | 2         | 5%       |
| 35-40                         | 4         | 10%      |
| 41-46                         | 1         | 1%       |
| 47-52                         | 0         | 0.33%    |
| <b>Gender</b>                 |           |          |
| Male                          | 11        | 25.83%   |
| Female                        | 29        | 74.17%   |
| <b>Educational Attainment</b> |           |          |
| High School Level             | 4         | 10%      |
| High School-Graduate          | 6         | 15%      |
| College Level                 | 14        | 35%      |
| College Graduate              | 6         | 15%      |
| Faculty and Staff             | 10        | 25%      |
| <b>Occupation</b>             |           |          |
| Student                       | 30        | 79.17%   |
| Teacher                       | 10        | 20.83%   |

Table 2 reveals the summary of the sensory evaluation of melinjo in ice cream production in 4 treatments where T1 utilize  $\frac{1}{4}$  cup melinjo juice to the mixture, T2 with  $\frac{1}{2}$  cup melinjo juice, T3 with  $\frac{3}{4}$  cup melinjo juice, T4 with 1 cup melinjo juice.

The result reveals that in terms of appearance, T2 and T1 got the highest rate of 4.78 both were described as "Highly Acceptable". Although T3 and T4

were favored by the respondents, T2 was the most preferred. Appearance of food attracts the consumer to buy or eat the product. It is the most important attribute of any food's appearance is its color, especially when it is directly associated with other food-quality attributes, (D.B Mac Dougall, 2003).

In terms of aroma, T2 obtained the highest rate 4.63 describe as "Highly Acceptable", followed by T1 with a weighted mean of 4.5 described as "Highly acceptable" and T4 with a rate of 4.38 described as "Highly acceptable" and T3 with a rate of 4.31 described as "Highly acceptable". This implies that T2 was most acceptable by the respondents. Aroma is the characteristic smell of the food. It is inherent quality of food which consumers learn to discriminate or accept. Food aroma is very sensitive to the processing and storage conditions. After catching the sight appeal of the product, respondent direct drive is the aroma of the product. The product could not be seen, but its smell would at least the melting or disagreeable flavor it contained (Perenio, 2019).

In terms of mouthfeel T2 which generated the highest rate of 4.68 described as "Highly Acceptable" followed by T1 with weighted mean of 4.64 described as "Highly Acceptable" followed by T3 with weighted mean of 4.37 described as "Highly Acceptable" and T4 with the rate of 4.33 described as "Highly Acceptable". This implies that although T1 were favored by the respondents T2 was most preferred. Mouthfeel or the products water activity such as hard, crisp, soft, fine or grainy. Food texture is a collective term of sensory experiences originated from visual, audio and tactile stimuli ( S.U. kadam, 2015). The sensation of food texture plays a crucial role of influencing consumers liking

and preference of the food product. It also contributes to the appeal of the food that induced the customer appetite

Data revealed that out of four treatments, in terms of taste T2 gathered the highest rate of 4.67 and described as "Highly Acceptable" followed by T1 with a weighted mean of 4.63 described as "Highly Acceptable" and T4 with a rate of 4.18 described as "Moderately Acceptable". This denotes that T2 was most loved by the respondents because the general melting score was detected by their tongue.

For general acceptability of Melinjo ice cream, T2 got the highest rate of 4.78 described as "Highly Acceptable" followed by T1 with a weighted mean of 4.72 described as "Highly Acceptable" and T3 and T4 with the rate of 4.38 described as "Highly Acceptable". This denotes that T2 was the most acceptable by the respondents. Food acceptability is affected by many factors, which may be related to the individual, the food, or the environment in which the food is consumed. General acceptability refers to the sum total score of the products in terms of its appearance, aroma, taste and texture. This will determine the respondent sensory preference of the four treatment (Parenio,2019).

To sum up Table 2, Melinjo ice cream in (T1) obtained an average mean of 4.64 described us "Highly Acceptable" T2 got 4.71 described as "Highly Acceptable" and T3 and T4 got 4.33 described as "highly acceptable". This implies that Melinjo ice cream in T2 was the most acceptable among the four treatments.

Table 2.  
Acceptability level of melinjo ice cream in four treatments

| Sensory Attributes    | Treatment 1 (59ml) |                   | Treatment 2 (125ml) |                   | Treatment 3 (175ml) |                   | Treatment 4 (250ml) |                       |
|-----------------------|--------------------|-------------------|---------------------|-------------------|---------------------|-------------------|---------------------|-----------------------|
|                       | WM                 | Description       | WM                  | Description       | WM                  | Description       | WM                  | Description           |
| Appearance            | 4.73               | Highly Acceptable | 4.78                | Highly Acceptable | 4.38                | Highly Acceptable | 4.36                | Highly Acceptable     |
| Aroma                 | 4.5                | Highly Acceptable | 4.63                | Highly Acceptable | 4.31                | Highly Acceptable | 4.38                | Highly Acceptable     |
| Mouthfeel             | 4.64               | Highly Acceptable | 4.68                | Highly Acceptable | 4.37                | Highly Acceptable | 4.33                | Highly Acceptable     |
| Taste                 | 4.63               | Highly acceptable | 4.67                | Highly Acceptable | 4.21                | Highly Acceptable | 4.18                | Moderately Acceptable |
| General Acceptability | 4.72               | Highly Acceptable | 4.78                | Highly Acceptable | 4.38                | Highly Acceptable | 4.38                | Highly Acceptable     |
| Average Weighted mean | 4.64               | Highly Acceptable | 4.71                | Highly acceptable | 4.33                | Highly Acceptable | 4.33                | Highly Acceptable     |

| Indications: | Range   | Description           |
|--------------|---------|-----------------------|
|              | 4.2-5.0 | - Highly Acceptable   |
|              | 3.4-4.1 | - Moderate Acceptable |
|              | 2.6-3.3 | - Acceptable          |
|              | 1.8-2.5 | - Less Acceptable     |
|              | 1.0-1.7 | - Not Acceptable      |

Table 3 shows the data in determining the visual quality of the Melinjo ice cream that was stored in the freezer within 42 days. It was found out that treatment 2 had reached 37 days with no changes happen which becomes defected at 42 days. Likewise, T2 change its color at 38<sup>th</sup> day, gave its unnatural flavor the following day and become unpleasant at 41<sup>st</sup> day. On the other hand, T1 and T3 changed its mouthfeel at 37<sup>th</sup> day while T4 at 36<sup>th</sup> day.

Table 3.  
Visual Quality Evaluation of Melinjo Ice Cream

| DAYS | 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       |
| 15   | No Changes       | No Changes       | No Changes       | No Changes       |
| 20   | No Changes       | No Changes       | No Changes       | No Changes       |
| 25   | No Changes       | No Changes       | No Changes       | No Changes       |
| 30   | No Changes       | No Changes       | No Changes       | No Changes       |
| 35   | No Changes       | No Changes       | No Changes       | No Changes       |
| 36   | Change color     | No changes       | Unnatural flavor | Unnatural flavor |
| 37   | Change texture   | No changes       | Change Color     | Change texture   |
| 38   | Unnatural flavor | Changed Color    | Change texture   | Rancid           |
| 39   | Unnatural flavor | Unnatural flavor | Unnatural flavor | Rancid           |
| 40   | Unpleasant       | Unnatural flavor | Rancid           | Spongy           |
| 41   | Unpleasant       | Unpleasant       | Spongy           | Unpleasant       |
| 42   | Defected         | Defected         | Unpleasant       | Defected         |
|      |                  |                  | Defected         | Defected         |

The observe F obtained from appearance is 12.481 which is significant at 0.05 level of significant with df (3) and p-value of 2.3327E-07. This means that there is a significant difference in the appearance of melinjo ice cream, therefore the null hypothesis is rejected. In terms of aroma, the computed F-Value is 3.094 which are significant at 0.05 level of significance with df (3) and P-Value of 0.028694773. This means that there is a significant difference in the aroma of melinjo ice cream therefore the null hypothesis is rejected.

Table 4 manifest the F-Value obtained for taste is 12.545 which are significant at 0.05 level of significance with df (3) and P- Value of 2.16204E-07. This means that there is a significant difference in the taste of melinjo ice cream, therefore the null hypothesis is rejected. For the texture, the F-Value is 7.963

which are significant at 0.05 level of significance with df (3) and P-Value of 5.681E-05. This means that there is significant difference in the texture of melinjo ice cream therefore the null hypothesis is rejected. To sum up its sensory attributes this is represented by its general acceptability. The F-Value generated for the general acceptability is 12.942 which are significant at 0.05 level of significance with df (3) and P-Value of 1.35661E-07. This means that there is a significant difference in the General sensory evaluation of melinjo ice cream, therefore the hypothesis is rejected.

Table 4

Significant Difference in the Sensory Evaluation of Melinjo in Ice Cream in Terms of Different Sensory Attributes.

| Sensory Attributes    | Degree Of Freedom | Sum Of Square | Mean Square | Observe F | P-Value     | Descrip-tion | Interpre-tation |
|-----------------------|-------------------|---------------|-------------|-----------|-------------|--------------|-----------------|
| Appearance            | 3                 | 6.089         | 2.030       | 12.481    | 2.3327E-07  | Significant  | Reject Ho       |
| Aroma                 | 3                 | 2.433         | 0.811       | 3.094     | 0.028694773 | Significant  | Reject Ho       |
| Mouthfeel             | 3                 | 3.919         | 1.306       | 7.963     | 5.681E.05   | Significant  | Reject Ho       |
| Taste                 | 3                 | 8.156         | 2.719       | 12.545    | 2.16204E-07 | Significant  | Reject Ho       |
| General Acceptability | 3                 | 5.736         | 1.912       | 12.942    | 1.35661E-07 | Significant  | Reject Ho       |

Comparison between paired treatments is needed to provide specific information on which means are significant by different from each other. Post hoc analysis in the analysis of variance was the test being employed in order to determine honestly significant differences (HSD) among paired treatments in

RISU-BILAP CAMPUS  
LIBRARY

term of appearance, aroma, taste, mouthfeel, and General Acceptability. The mean difference is compared to the computed honestly significant difference in order to identify the description that will give us decision.

Table 4 shows that paired treatments is appearance (T1 vs. T3; T1 vs. T4; T2 vs. T3; T2 vs. T4), aroma (T2 vs. T4), taste (T1 vs. T3; T1 vs. T4; T2 vs. T3; T2 vs. T4), texture (T1 vs. T3; T1 vs. T4; T2 vs. T3; T2 vs. T4), and General Acceptability (T1 vs. T3; T1 vs. T4; T2 vs. T3; T2 vs. T4) have a significant difference.

The result below implies that the paired treatments mentioned below have significant differences in the appearance, aroma, taste, mouthfeel & general sensory evaluation of melinjo in ice cream production because of the four treatment varying consistency due to the different measurement used. Meanwhile, in term of appearance (T1 vs. T2; T3 vs. T4), aroma (T1 vs. T2; T1 vs. T3; T1 vs. T4; T2 vs. T4), texture (T1 vs. T2; T3 vs. T4) taste (T1 vs. T2; T3 vs. T4) and general sensory evaluation (T1 vs. T2; T3 vs. T4) has no significant difference in the respondent preferences of melinjo ice cream.

Table 5

Comparison of Post Hoc Analysis result of the sensory evaluation of melinjo in ice cream production in four treatments in terms of sensory attributes.

| Post Hoc Analysis for Appearance                 |             |                |                   |
|--|-------------|----------------|-------------------|
| Pairing of Treatments                            | P-value     | Interpretation | Decision          |
| T1 vs. T2  | 0.369243461 | Insignificant  | Accept Hypothesis |
| T1 vs. T3  | 7.58697E-05 | Significant    | Reject Hypothesis |
| T1 vs. T4  | 0.00018471  | Significant    | Reject Hypothesis |
| T2 vs. T3  | 1.06026E-05 | Significant    | Reject Hypothesis |
| T2 vs. T4  | 3.08991E-05 | Significant    | Reject Hypothesis |
| T3 vs. T4  | 0.87383096  | Insignificant  | Accept Hypothesis |
| Post Hoc Analysis for Aroma                      |             |                |                   |
| T1 vs. T2  | 0.141059134 | Insignificant  | Accept Hypothesis |
| T1 vs. T3  | 0.049948062 | Insignificant  | Accept Hypothesis |
| T1 vs. T4  | 0.397053695 | Insignificant  | Accept Hypothesis |
| T2 vs. T3  | 0.000383066 | Significant    | Reject Hypothesis |
| T2 vs. T4  | 0.058102616 | Insignificant  | Accept Hypothesis |
| T2 vs. T4  | 0.56986309  | Insignificant  | Accept Hypothesis |
| Post Hoc Analysis for Mouthfeel                  |             |                |                   |
| T1 vs. T2  | 0.55894482  | Insignificant  | Accept Hypothesis |
| T1 vs. T3  | 0.00142848  | Significant    | Reject Hypothesis |
| T1 vs. T4  | 0.002514821 | Significant    | Reject Hypothesis |
| T2 vs. T3  | 0.00029632  | Significant    | Reject Hypothesis |
| T2 vs. T4  | 0.00067897  | Significant    | Reject Hypothesis |
| T3 vs. T4  | 0.795087765 | Insignificant  | Accept Hypothesis |
| Post Hoc Analysis for Taste                      |             |                |                   |
| T1 vs. T2  | 0.60708767  | Insignificant  | Accept Hypothesis |
| T1 vs. T3  | 0.92151E-05 | Significant    | Reject Hypothesis |
| T1 vs. T4  | 0.000253563 | Significant    | Reject Hypothesis |
| T2 vs. T3  | 3.349E-06   | Significant    | Reject Hypothesis |
| T2 vs. T4  | 3.83413E-05 | Significant    | Reject Hypothesis |
| T3 vs. T4  | 0.839894699 | Insignificant  | Accept Hypothesis |
| Post Hoc Analysis for General Sensory Evaluation |             |                |                   |
| T1 vs. T2  | 0.287993715 | Insignificant  | Accept Hypothesis |
| T1 vs. T3  | 0.000195641 | Significant    | Reject Hypothesis |
| T1 vs. T4  | 0.000195641 | Significant    | Reject Hypothesis |
| T2 vs. T3  | 6.09741E-06 | Significant    | Reject Hypothesis |
| T2 vs. T4  | 6.09741E-06 | Significant    | Reject Hypothesis |
| T3 vs. T4  | 1           | Insignificant  | Accept Hypothesis |

## Chapter III

### SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter deals with the summary of the study, findings, conclusion and recommendation based on the analysis and interpretation of the data.

#### SUMMARY

The main objective in conducting the study was to determine the acceptability of Melinjo ice cream. It specifically attempted to determine the acceptability of Melinjo ice cream in terms of appearance, aroma, mouthfeel, taste and general sensory evaluation, the visual quality evaluation of the different treatment of Melinjo ice cream and the significant difference among treatments in terms of their sensory attributes. Furthermore, it aimed to formulate a proposed techno guide of the product.

The study used the complete randomized design (CRD) with the questionnaire as an instrument in gathering data.

The study was conducted at the Bohol Island State University Bilar Campus Zamora, Bilar, Bohol. The respondents were composed of ten (10) BSIT-FPSM, ten (10) BSHM, ten (10) High School students and ten (10) faculty and Staff handling food and food related courses. The data was collected, tallied, and computed using the weighted mean to determine the acceptability of Melinjo ice cream and the one- way ANOVA to determine their significant difference of sensory attributes of Melinjo in different treatments.

After the data were collected and interpreted, the researchers found out that most of the respondents were 17-22 years old, female, college level and students. As to Appearance, T2-125ml of Melinjo juice had to the highest weighted mean scale of 4.78 with descriptive interpretation of "Highly Acceptable". To sum up, only T4- 250 ml of Melinjo juice had descriptive interpretation of "Moderately Acceptable". As to Aroma, also T2- 125 ml of Melinjo juice had the highest weighted mean scale of 4.63 with descriptive interpretation of "Highly Acceptable". In terms of mouthfeel, also T2- 125ml of Melinjo juice had the highest weighted mean scale of 4.68 with descriptive interpretation of "Highly Acceptable". In terms Taste, T2-125ml of Melinjo juice had the highest weighted mean scale of 4.67 with descriptive interpretation of "Highly Acceptable" and as to General Acceptability T2-125ml of Melinjo had the highest weighted mean scale of 4.78 with descriptive interpretation of "Highly Acceptable". The right quantity of Melinjo juice was T2-125ml of Melinjo juice. T2 got the highest quality among the treatments. The analysis of variance showed no significant difference among the treatments. The null hypothesis was rejected.

## Conclusions

Based on the results, the researchers were able to draw the following recommendation;

1. The study found out that most of the respondents were 17-22 years old, female, college level and students.

2. The most acceptable treatment of different treatment of Melinjo Ice cream in terms of the sensory attributes is the treatment 2 ( $\frac{1}{2}$  cup of Melinjo juice).
3. In terms of visual quality evaluation, it was found out that treatment 2 got the highest number of days where product has no changes took place (37<sup>th</sup> day).
4. There is no significant difference in the sensory evaluation of melinjo ice cream in terms of the different attributes. The null hypothesis was rejected.
5. T2 ( $\frac{1}{2}$  cup melinjo juice) can be offered as techno guide based on the output of the study.

## Recommendations

Based on the conclusions, the researchers came up with the following recommendations;

1. Farmers may consider producing more Melinjo trees to supply the production of Melinjo ice cream.
2. Entrepreneurial and production of the product should be introduced to both school and community as an income generating activity.
3. The techno guide should be introduced to promote the use of Melinjo ice cream.
4. Future researchers may conduct related studies to develop/innovate more products from Melinjo ice cream

# TECHNO-GUIDE OF MELINJO ICE CREAM



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



*Department of Hospitality Management  
and Industrial Technology*

## Technology Guide On Melinjo Ice Cream



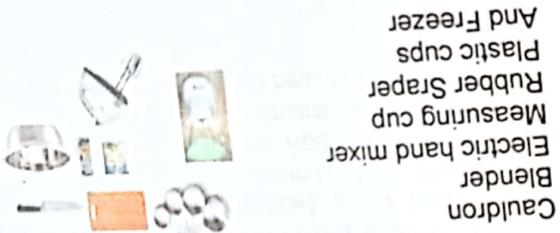
The actual ingredients used in the study of,

**Ingredients:**



Melino Ice Cream  
All purpose cream  
Condensed milk  
Melino leaves

**Material Used**



Cauldron  
Blender  
Electric hand mixer  
Measuring cup  
Rubber Straper  
Plastic cups  
And Freezer

The tools and equipment were checked properly to ensure its working efficacy before the researcher gathered to endure the product formulation. The materials used of this study are owned by the researchers.

Melino (*Gnetum gnemon*) is a bittersweet flavored, a species of tree in the family of Gnetaceae. The leaves are bronze colored and turn smooth shady green when full-fledged. The young leaves, inflorescence and fruits are comestible and used as one of the main ingredients mixed along with other leafy vegetable when cooking ginataan or tinunuan (coconut milk) and the law-oy or utan bisaya. It can also be prepared as a salad. Melino plant is proven for many benefits like brain health, assist growth, regulate the temperature, skin health, prevent stroke, and treat cramps, kidney health, and muscles, regeneration of cells and tissues and hair health. It is also rich in protein, fiber, copper, potassium, phosphorus, calcium, iron, vitamin A, antioxidants, zinc, manganese, and magnesium. The mentioned health functions considered the plant to be herb.

**OBJECTIVES**

The objectives of this proposed technology guide are the following:

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

## References

- Barua, C., Haloi, P., & Barua, C. (2015). *Gnetum gnemon* linn.: A comprehensive review on its biological, pharmacological and pharmacognostical potentials (Vol. 7). Retrieved from [http://www.researchgate.net/publication/281759358\\_Gnetum\\_gnemon\\_linn\\_A\\_comprehensive\\_review\\_on\\_its\\_biological\\_pharmacological\\_and\\_pharmacognostical\\_potentials](http://www.researchgate.net/publication/281759358_Gnetum_gnemon_linn_A_comprehensive_review_on_its_biological_pharmacological_and_pharmacognostical_potentials)
- E, B. (2011). *Gnetum gnemon*. The IUCN Red List of Threatened Species.
- Elsevier. (2014). *Erratum in Food Chem Toxinol*. Retrieved from <http://pubmed.ncbi.gov/24602828/>
- kadam, S., & Donnel, C. (2015). *in modifying food texture*.
- M, S. (2016). *melinjo-Gnetumgnemon health benefits*. Retrieved from <http://www.healthbenefits.com/melinjo/>
- malic, s. (2019). *vegetable ice cream*. Retrieved from <https://www.newsbytesapp.com/news/india/what-is-vegetable-ice-cream/story>
- Mukul. (2020). *Health benefitslime.com/melinjo*. Retrieved 2021, from <http://findmeacure.com/2020/02/22/melinjo/>
- Olmedo, R., Nepote, V., & Grosso, N. R. (2014, August ). Antioxidant activity of fractions from oregano essential oils obtained by molecular distillation. *National Library of Medicine*, 1, 156:212-9. doi:DOI: 10.1016/j.foodchem.2014.01.087
- Parhusip, A., & Sitanggang, A. B. (2012, January). Antimicrobial Activity of Melinjo Seed and Peel Extract (*Gnetum gnemon*) Against Selected Pathogenic Bacteria. doi:10.5454/mi.5.3.2
- Supriyadi, A., Arum, L. S., Nugraha, A. S., & Ratnadewi, A. A. (2019, August). Revealing Antioxidant and Antidiabetic Potency of Melinjo (*Gnetum Gnemon*) Seed Protein Hydrolysate at Different Stages of Seed Maturation. doi:10.12944/CRNFSJ.7.2.17



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



April 12, 2021

Thesis Committee Member  
Madam/Sir

The undersigned has the honor to request your approval as member of the committee for the thesis of the undergraduate students of their requirements of the degree **BACHELOR OF SCIENCE IF INDUSTRIAL TECHNOLOGY** with the specialization of **FOOD PREPARATION SERVICE MANAGEMENT**.

**TITLE**

"Sensory Evaluation on the Different Level of Melinjo (*Gnetum gnemon*)  
in Ice Cream Production  
"

The candidate has been instructed to have consultation with you about the above title. Kindly make the necessary recommendations to have a successful research output.

Thank you for your assistance on this matter.

Very truly yours,

**NELIA Q. CATAYAS**  
Subject Instructor

| <b>CONFORM</b><br>Name of Faculty | Committee       | Signature |
|-----------------------------------|-----------------|-----------|
| 1. Jenevab D. Ecat                | Adviser         | _____     |
| 2. Herbert Piollo                 | Statistician    | _____     |
| 3. HersheyLou Cabig               | Internal Expert | _____     |
| 4. John Anthony D. Piollo         | Editor          | _____     |

## APPENDIX B



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



**MARIETTA C. MACCALOLOLOT, Ph.D.**  
Campus Director  
BISU-Bilar Campus

April 12, 2021

Greetings!

We, the third year college students of Bohol Island State University pursuing the degree in Bachelor of Science in Industrial Technology major in Food Preparation Service Management (BSIT-FPSM3) and currently enrolled in Technology Research II in the S.Y. 2020-2021. In partial fulfillment of the degree, the researchers are asking permission from your good office to conduct a study entitled **“Sensory Evaluation on the Different Level of Melinjo (*Gnetum gnemon*) in Ice Cream Production”**.

In line with this, we would like to ask permission from your humble office to allow us to distribute and gather the data necessary in this study. We the researchers assure that this undertaking 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 are looking forward for your approval.  
Thank you so much and God Bless!

Very Truly Yours,  
Gina Lou G. Batausa  
Jonnabell M. Cruza  
Arlene Jade A. Perido  
Alben D. Suarez  
**Researchers**

Noted by:

Recommending Approval:

**(Sgd) JENEVEB D. ECAT**  
Adviser

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

Approved by:

**(Sgd) MARIETTA C. MACCALOLOLOT, Ph.D.**

Campus Director  
APPENDIX C



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 of Bohol and the country.

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

### Modified 5 Hedonic Scale on Sensory Evaluation on the Different Level of Melinjo (*Gnetum gnemon*) in Ice Cream Production

#### I. Profile of respondents

Age: \_\_\_\_\_

Sex: \_\_\_\_\_

Civil Status: \_\_\_\_\_

Educational Attainment: \_\_\_\_\_

Occupation: \_\_\_\_\_

II. Direction: The descriptions attached are the scale for the evaluation to our product. Mark a check (✓) below to your desired scale that could describe your appraisal according to its criteria, sensory and treatments.

| T R E A T M E N T | Sensory Preference | Like Very Much (5) | Like Moderately (4) | Neither Like or Dislike (3) | Dislike Moderately (2) | Dislike Very Much (1) |
|-------------------|--------------------|--------------------|---------------------|-----------------------------|------------------------|-----------------------|
|                   | Taste              |                    |                     |                             |                        |                       |
| Aroma             |                    |                    |                     |                             |                        |                       |
| Texture           |                    |                    |                     |                             |                        |                       |
| Appearance        |                    |                    |                     |                             |                        |                       |

|   |                       |  |  |  |  |  |  |  |  |
|---|-----------------------|--|--|--|--|--|--|--|--|
| 1 | General Acceptability |  |  |  |  |  |  |  |  |
|   | Taste                 |  |  |  |  |  |  |  |  |
|   | Texture               |  |  |  |  |  |  |  |  |
|   | Appearance            |  |  |  |  |  |  |  |  |
| 2 | General Acceptability |  |  |  |  |  |  |  |  |
|   | Taste                 |  |  |  |  |  |  |  |  |
|   | Aroma                 |  |  |  |  |  |  |  |  |
|   | Texture               |  |  |  |  |  |  |  |  |
| 3 | Appearance            |  |  |  |  |  |  |  |  |
|   | General Acceptability |  |  |  |  |  |  |  |  |
|   | Taste                 |  |  |  |  |  |  |  |  |
|   | Aroma                 |  |  |  |  |  |  |  |  |
| 4 | Texture               |  |  |  |  |  |  |  |  |
|   | Appearance            |  |  |  |  |  |  |  |  |
|   | General Acceptability |  |  |  |  |  |  |  |  |
|   | Taste                 |  |  |  |  |  |  |  |  |

Suggestions/Recommendation: \_\_\_\_\_

---



---



---



---

## **Description:**

### **TASTE**

Like Very Much- It taste good with quality and increases one's appetite  
 Like Moderately- It taste partially good  
 Neither like nor dislike- Neutral  
 Dislike moderately- bitter  
 Dislike Very Much- too much bitter

### **AROMA**

Like Very Much- appetizing aroma  
 Like Moderately- The aroma is good  
 Neither like nor dislike - Neutral  
 Dislike moderately- no aroma  
 Dislike Very Much- Bitter aroma

### **TEXTURE**

Like Very Much- very smooth  
 Like moderately- smooth  
 Neither like nor dislike- Neutral  
 Dislike moderately- lacks of moisture  
 Dislike Very Much- hard/icy

### **APPEARANCE**

Like Very Much- looks very palatable that's capture one's attention  
 Like moderately- looks pleasing in its appearance  
 Neither like nor dislike- Neutral  
 Dislike moderately- dislikes the appearance and can't capture one's appetite  
 Dislike Very Much- I really don't like the appearance

### **GENERAL ACCEPTABILITY**

Like Very Much- very much acceptable  
 Like moderately- moderately acceptable  
 Neither like nor dislike- neutral  
 Dislike moderately- not acceptable  
 Dislike Very Much- not acceptable very much

## APPENDIX D

## Computation of the one-way Analysis of Variance

Taste

| Groups | Count | Sum    | Average | Variance    |
|--------|-------|--------|---------|-------------|
| T1     | 40    | 185.03 | 4.63    | 0.149743013 |
| T2     | 40    | 186.69 | 4.67    | 0.108666604 |
| T3     | 40    | 168.35 | 4.21    | 0.226708654 |
| T4     | 40    | 167.35 | 4.18    | 0.381731731 |

ANOVA

| Source of Variation | Sum of Square | Degree of Freedom | Mean Square | F          | Significant |
|---------------------|---------------|-------------------|-------------|------------|-------------|
| Between Groups      | 8.1559475     | 3                 | 2.71864917  | 12.5449578 | 2.662568549 |
| Within Groups       | 33.80715      | 156               | 0.2167125   |            |             |
| Total               | 41.9630975    | 159               |             |            |             |

Aroma

| Groups | Count | Sum    | Average | Variance    |
|--------|-------|--------|---------|-------------|
| T1     | 40    | 180    | 4.5     | 0.194651282 |
| T2     | 40    | 185.36 | 4.63    | 0.130193846 |
| T3     | 40    | 172.3  | 4.31    | 0.179152564 |
| T4     | 40    | 175.37 | 4.38    | 0.544358397 |

## ANOVA

39

| Source of Variation | Sum of Square | Degree of Freedom | Mean Square | F          | Significant |
|---------------------|---------------|-------------------|-------------|------------|-------------|
| Between Groups      | 2.432781875   | 3                 | 0.810927292 | 3.09409102 | 2.662568549 |
| Within Groups       | 40.8858875    | 156               | 0.262089022 | 3          |             |
| Total               | 43.31866938   | 159               |             |            |             |

## Texture

| Groups | Count | Sum    | Average | Variance    |
|--------|-------|--------|---------|-------------|
| T1     | 40    | 185.68 | 4.64    | 0.099667692 |
| T2     | 40    | 187.35 | 4.68    | 0.102726603 |
| T3     | 40    | 174.7  | 4.37    | 0.175962821 |
| T4     | 40    | 169.04 | 4.33    | 0.280883131 |

## ANOVA

| Source of Variation | Sum of Square | Degree of Freedom | Mean Square | F        | Significant |
|---------------------|---------------|-------------------|-------------|----------|-------------|
| Between Groups      | 3.9192695     | 3                 | 1.306423167 | 7.963023 | 2.662945545 |
| Within Groups       | 25.4294865    | 155               | 0.164061203 |          |             |
| Total               | 29.348756     | 158               |             |          |             |

## Appearance

| Groups | Count | Sum    | Average | Variance    |
|--------|-------|--------|---------|-------------|
| T1     | 40    | 189.03 | 4.76    | 0.073748141 |
| T2     | 40    | 191.37 | 4.78    | 0.094086603 |
| T3     | 40    | 175.04 | 4.38    | 0.206460513 |
| T4     | 40    | 174.34 | 4.36    | 0.276166923 |

## ANOVA

| Source of Variation | Sum of Square | Degree of Freedom | Mean Square | F           | Significant |
|---------------------|---------------|-------------------|-------------|-------------|-------------|
| Between Groups      | 6.0885725     | 3                 | 2.029524167 | 12.48050528 | 2.662568549 |
| Within Groups       | 25.368025     | 156               | 0.162615545 |             |             |
| Total               | 31.4565975    | 159               |             |             |             |

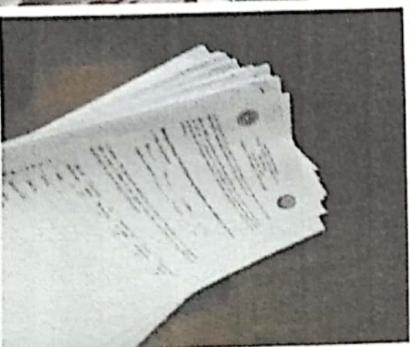
## General Acceptability

| Groups | Count | Sum    | Average | Variance    |
|--------|-------|--------|---------|-------------|
| T1     | 40    | 188.71 | 4.72    | 0.088725577 |
| T2     | 40    | 191.37 | 4.78    | 0.065825064 |
| T3     | 40    | 175.01 | 4.36    | 0.218205064 |
| T4     | 40    | 175.01 | 4.36    | 0.218205064 |

## ANOVA

| Source of Variation | Sum of Square | Degree of Freedom | Mean Square | F           | Significant |
|---------------------|---------------|-------------------|-------------|-------------|-------------|
| Between Groups      | 5.7359675     | 3                 | 1.911989167 | 12.94156408 | 2.662568549 |
| Within Groups       | 23.04747      | 156               | 0.147740192 |             |             |
| Total               | 28.7834375    | 159               |             |             |             |

APPENDIX E  
DOCUMENTATION













## APPENDIX G

## RESEARCHER'S BIODATA

## PERSONAL DATA



Name : GINALOU G. BATAUSA  
 Address : Katipunan, Carmen, Bohol  
 Place of Birth : Katipunan, Carmen, Bohol  
 Date of Birth : June 19, 2000  
 Citizenship : Filipino  
 Civil Status : Single  
 Father : Renato M. Batausa  
 Mother : Gemma G. Batausa

## EDUCATIONAL ATTAINMENT

Elementary : Katipunan Elementary School  
                   Katipunan, Carmen, Bohol  
                   S. Y. 2011-2012  
 Secondary : Katipunan, National High school  
                   Katipunan, Carmen, Bohol  
                   S. Y 2017-2018  
 Tertiary : Bohol Island State University  
             Bilar Campus  
             Zamora, Bilar, Bohol  
             Bachelor of Science in Industrial Technology  
             Major in Food Preparation Service Management

## AFFILIATIONS

COOKERY                   NCII HOLDER  
 COSMETIC                 NCII HOLDER

## RESEARCHER'S BIODATA

48

### PERSONAL DATA

Name : JONNABELL M. CRUZA  
Address : Montesuerte, Carmen, Bohol  
Place of Birth : Montesuerte, Carmen , Bohol  
Date of Birth : June 20, 1999  
Citizenship : Filipino  
Civil Status : Single  
Father : Eleno R. Cruza  
Mother : Susana B. Marzon



### EDUCATIONAL ATTAINMENT

Elementary : Montesuerte, Elementary School  
Montesuerte, Carmen, Bohol  
2011-2012  
Secondary : Pedro S. Budiongana High school  
Montesuerte, Carmen, Bohol  
S. Y 2017-2018  
Tertiary : Bohol Island State University  
Bilar Campus  
Zamora , Bilar, Bohol  
Bachelor of Science in Industrial Technology  
Major in Food Preparation Service Management

**AFFILIATIONS**  
FOOD AND BEVERAGES AND SERVICES  
BREAD AND PASTRY PRODUCTION  
COOKERY

NCII HOLDER  
NCII HOLDER  
NCII HOLDER

## RESEARCHER'S BIODATA

### PERSONAL DATA

Name : ARLENE JADE A. PERIDO  
 Address : El Salvador, Carmen, Bohol  
 Place of Birth : Montesuerte, Carmen, Bohol  
 Date of Birth : August 14, 2000  
 Citizenship : Filipino  
 Civil Status : Single  
 Father : Ernesto R. Perido  
 Mother : Ma. Flor A. Perido



### EDUCATIONAL ATTAINMENT

Elementary : El Salvador Elementary School  
                   El Salvador, Carmen, Bohol  
                   S. Y 2011-2012  
 Secondary : Ambassador Pablo R. Suarez National High School  
                   Bicao, Carmen, Bohol  
                   S. Y. 2017-2018  
 Tertiary : Bohol Island State University  
                   Bilar Campus  
                   Zamora , Bilar, Bohol  
                   Bachelor of Science in Industrial Technology  
                   Major in Food Preparation Service Management

### AFFILIATIONS

FOOD AND BEVERAGES AND SERVICES  
 BREAD AND PASTRY PRODUCTION  
 COOKERY

NCII HOLDER  
 NCII HOLDER  
 NCII HOLDER

## RESEARCHER'S BIODATA

50

### PERSONAL DATA

Name : ALBEN D. SUAREZ  
Address : El Progreso, Carmen, Bohol  
Place of Birth : El Progreso, Carmen, Bohol  
Date of Birth : October 30, 1999  
Citizenship : Filipino  
Civil Status : Single  
Father : Simeon A. Suarez  
Mother : Mercidita D. Suarez



### EDUCATIONAL ATTAINMENT

Elementary : Tu-an Elementary School  
Montesuerte, Carmen, Bohol  
S.Y. 2011-2012  
Secondary : Pedro S. Budiongana High School  
Montesuerte, Carmen, Bohol  
S.Y. 2017-2018  
Tertiary : Bohol Island State University  
Bilar Campus  
Zamora, Bilar, Bohol  
Bachelor of Science in Industrial Technology  
Major in Food Preparation Service Management

### AFFILIATIONS

FOOD AND BEVERAGES AND SERVICES      NCII HOLDER  
BREAD AND PASTRY PRODUCTION          NCII HOLDER  
COOKERY    NCII HOLDER

