

**Utilization of Miracle Fruit (*Crescentia cujete*) in making Barquettes**

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ABSTRACT

The primary goal of the study was to evaluate the degree to which the Miracle Fruit (*Crescentia cujete*) was used in the production of barquettes in terms of appearance, aroma, taste, texture, general acceptance, and packaging. A four-point hedonic scale was employed to evaluate the product in this study, which used an experimental design and a questionnaire and interview as data collection tools. This study was conducted in the four campuses of Bohol Island State University (BISU) namely Balilihan, Bilar, Calape, and Main Campus in Tagbilaran City and nearby establishments of Municipality of Calape To assess the acceptability of the use of the miracle fruit (*Crescentia cujete*) in the production of barquettes, the data collected were tabulated using the one-way analysis of variance (ANOVA), which provided the foundation for assessing the respondents' perceptions of its acceptability. The laboratory results revealed that Barquettes are free from bacterial contamination and have the nutritive contents like fat, sodium, carbohydrates, protein, potassium and energy value of 300-350kcal. According to the results, plain barquette comes in fourth and chocolate-flavored barquette comes in first. The four treatments were all deemed acceptable, and the findings showed that there were substantial differences in the respondents' acceptance of the four treatments in terms of scent, taste, texture, and general preference. This implied that the products are marketable and preferred by the consumers. Thus, the acceptability of the product manifests the feasibility for the commercialization and as technology package for the industry to augment the income of the homemakers.

Keywords: Barquettes, Miracle Fruit, Tart, Process of making tart, Process of making boat tart

INTRODUCTION

People, nowadays are getting conscious of their health and body. For this reason, people vary their food preferences due to a lot of factors like the nutritional value, influence of taste, psychological, emotional, culture, health and the economic status. It was already a tradition of every family to have cultural values to follow particularly food for the benefit of oneself.

Many Filipinos love to eat snacks such as bread, cake, pastries, native food and desserts. Pastries for instance can be in various types, forms and sizes to fit the choices of diners. It could be a tiny pie with dough folded over the filling or a tiny pie shell without a top. Barquette filling can be a jelly, custard, or fruit to enhance the palatability of the Barquette. In this study, calabash was used as filling for Barquettes.

There is a peculiar fruit that always attracts the attention of everybody who sees it in the countryside. Although it is still relatively unknown, it resembles a young coconut and is about the size of a watermelon. Even stranger, the scientific name for it is "*Crescentia cujete*" and is spelled "calabash". Calabacero is the name used in Spain, whereas totumo is used in Colombia and Panama, mate is used in Ecuador, pate is used in Peru, jicaro is used in Mexico, higuera is used in Puerto Rico, and rum tree is used in Sri Lanka (Tacio, H., 2015).

In some localities of Bohol, many people plant the miracle fruit locally known as calabash. This fruit grows even in the backyard or farm. Miracle fruit or calabash bears fruit regardless of the season. People may harvest the fruit as needed. Miracle fruit contains therapeutic value that cures different illnesses and diseases (Pramod, K. 2018).

The calabash or “*Crescentia cujete*” has its phytochemical properties of the extract such as alkaloids, Flavonoids, Tannins, and Carbohydrates. Alkaloid is basic nitrogenous compound that has pharmacologic activity. Flavonoid is capable of modulating activity of cell systems which exerts beneficial effects on the body. Tannin is a polyphenol that has anti-microbial properties and carbohydrates compounds containing carbon, hydrogen and oxygen utilized as substrates for various biochemical reactions (Pabelo, J., 2013).

Every part of the calabash tree has a unique application, making it notable for its versatility. The pulp of the fruit is used by natural healers to treat respiratory disorders like asthma and to make cough medication. Additionally, it includes hydrocyanic acid, a purgative. Syrup made from the pulp is used as a medication to treat dysentery as well as stomachaches. Moreover, the fruit has laxative qualities. Externally, the fruit's flesh treats bruises especially in youngsters, and helps to repair skin disorders.

The miracle fruit's most significant advantages include its capacity to control diabetic symptoms, support weight loss initiatives, strengthen the immune system, improve vision health, prevent chronic disease, among other things.

This fruit contains quantities of vitamin A, which has been directly related to better eye health, including a reduced risk of macular degeneration and cataract formation. Diabetic folks may benefit most from miracle fruit's health benefits because they can use it to replace sugar in their diets without risk. A few of the fruit's active components can naturally reduce insulin sensitivity, which is advantageous for diabetes people aside from the flavor impact (Zagar, T., 2012).

The body can benefit from an antioxidant boost from the abundance of polyphenolic chemicals in this fruit, which can lower free radical levels and lessen oxidative stress on organ systems. Numerous unfavorable side effects are associated with cancer treatment, including nausea and vomiting as well as a metallic aftertaste in the mouth. Miracle fruit can frequently reduce this lingering taste, helping to improve quality of life while receiving cancer treatment (Tacio, H., 2015).

The students' research revealed that the tree's fruit and leaf extracts contain flavonoids like quercetin and anthraquinone, the crucial phytochemicals for antiangiogenic activities, a process that prevents the growth and development of new blood vessels in the body, according to the Philippine Council for Health Research and Development (PCHRD), a line agency of the Department of Science and Technology (DOST).

For instance, the pulp is highly effective at treating respiratory issues like cough and asthma. To make a herbal syrup that heals digestive issues and decreases chest illnesses, the pulp's juice is combined with cinnamon, anise, and nutmeg.

Calabash is well renowned for its culinary benefits in addition to its healing properties. It is frequently fried and added to soups in Chinese cuisine. People in Japan purchase it as marinated strips, which they use to make wrapped sushi. The leaves are boiled and served in Burma with a fiery fish sauce.

The majority of the miracle fruits, however, were left to fall and perish on the ground, which is a really sad sight. People lack the expertise necessary to effectively use and innovate with this fruit. They dread the sticky scent and the flesh's dark color. But they are unaware of the fact that the miracle fruit's sweet, healing black juice is what gives it its name (Zagar, T., 2012).

Science and technology are of the utmost importance for the advancement of the nation, as stated in Article XIV of Section 10 of the Philippine Constitution of 1987. Therefore, research and development, invention, innovation, and other activities shall be prioritized by the State.

Researchers' efforts to advance the growth of the nation by converting raw materials into novel products will have the full backing of the State. By using these natural resources, the researchers may be able to improve their knowledge and capabilities. In this regard, this study was undertaken to promote awareness

to the people as well on how to utilize the Miracle Fruit “calabash” Barquettes as new food product or as a delicacy.

According to Republic Act 8976, when one or more population groups clearly need to ingest more essential nutrients, as demonstrated by dietary, biochemical, or clinical signs of deficiency, the State must recognize the need of food fortification.

Product development can be generally defined as any process that occurs from the moment a product initially gets created or invented until it is introduced to the market for some purposes like supplementing the nutrients needed in the body and curing some illnesses.

In this context, the researcher ventured to prepare Barquettes in different flavors by utilizing the calabash as the barquettes’ filling and to assess the acceptability of the Miracle Fruit Barquettes to provide an easy access of the fruit product to the people.

METHODOLOGY

This was an experimental research using parallel group design. A methodical and scientific approach to study is known as experimental research, and it involves manipulating one or more variables to track and assess changes in other variables. Definitely, In a parallel group design, often known as a parallel group research, two or more treatments are contrasted. To determine the respondent's thoughts on the acceptability of the Miracle fruit barquettes, participants were randomly allocated to either group, treatments were given, and then the findings were compared.

This research was carried out in the four satellite campuses of Bohol Island State University (BISU) namely Balilihan, Bilar, Calape, and Main Campus in Tagbilaran City and nearby establishments of selected food handlers of Ailene’s Bakeshop, Our deli bread, Julies Bakeshop and Mendoza’s Bakery which are located along the national road in Calape.

The researcher chose to conduct the study at the said campuses of the university since they offer technology courses, particularly Bachelor of Science in Industrial Technology Major in Food Technology. A total of 90 food handlers across different campuses of Bohol Island State University and selected bakers in the industry were the participants of this study. Out of 90, there were 18 students of Bachelor of Science in Industrial Technology Major in Food Technology (BSIT-Food Tech) from second year of Balilihan Campus, 18 students of Bachelor of Science in Industrial Technology Major in Food Technology (BSIT-Food Tech) from first year of Bilar Campus, 17 students of Bachelor of Science in Industrial Technology Major in Food Technology (BSIT-Food Tech) from third year of Calape Campus, 17 students of Bachelor of Science in Industrial Technology Major in Food Technology (BSIT-Food Tech) from third year of Main Campus, and 10 instructors in Food Technology 2 for Balilihan Campus, 2 for Bilar Campus, 3 for Calape Campus, 3 for Main Campus and 10 selected food handlers and experts in the industry namely 3 bakers of Ailene’s Bakeshop, 2 of Our deli bread, 3 for Julies Bakeshop and 2 of Mendoza’s Bakery. They were chosen as the respondents of the study because they were the most steadfast and more dependable in answering the queries both in the questionnaires and interview.

A four-point Hedonic scale was used to determine the data needed for the information and evaluation of the appropriateness of miracle fruit Barquettes in terms of flavor, texture, and look, taste, packaging and overall liking. This scale was used to measure the respondents’ preferences for the products’ sensory attributes and indicate the extent of their product liking.

Ingredients of the Miracle Fruit “*Crescentia cujete*” Barquettes

Ingredients	Treatment 1 Miracle Fruit Barquettes (Plain)	Treatment 2 Miracle Fruit Barquettes (Tea Flavor)	Treatment 3 Miracle Fruit Barquettes (Chocolate Flavor)	Treatment 4 Miracle Fruit Barquettes (Coffee Flavor)
Crust				
All-purpose flour	2.5 cups	2.5 cups	2.5 cups	2.5 cups

Unsalted butter (cold)	5 Tbsp	5 Tbsp	5 Tbsp	5 Tbsp
Salt	¼ tsp	¼ tsp	¼ tsp	¼ tsp
Egg yolk (chilled)	1 piece	1 piece	1 piece	1 piece
Miracle fruit juice	28 ml	28 ml	28 ml	28 ml
Waste miracle fruit pulverized	1 tsp	1 tsp	1 tsp	1 tsp
Filling				
Miracle fruit juice	110 ml	110 ml	110 ml	110 ml
Sugar	1/8 cup	1/8 cup	1/8 cup	1/8 cup
Egg yolk	1 pc	1 pc	1 pc	1 pc
Cornstarch	½ Tbsp	½ Tbsp	½ Tbsp cornstarch	½ Tbsp cornstarch
Flavor		¼ cup tea	1 Tbsp chocolate granules	½ tsp coffee
Condensed Milk			56 ml	
Meringue				
Egg white	3 pcs	3 pcs	3 pcs	3 pcs
Cream of tartar	¼ tsp	¼ tsp	¼ tsp	¼ tsp
Salt	1/8 tsp	1/8 tsp	1/8 tsp	1/8 tsp
Granulated sugar	½ cup	½ cup	½ cup	½ cup

Tools and equipment used

The equipment and instruments required to make the Miracle Fruit Barquettes were accessible since oven, boat tart molder, rolling pin, electric mixer, strainer, measuring cup, measuring spoon, mixing bowl, baking sheet, wooden ladle, spatula, sauce pan, weighing scale, and pastry bag and tips are available in the super market.

Procedure

The researcher formulated the three separate procedure in making Miracle Fruit Barquettes. There was a separate procedure for crust, followed by filling and the meringue.

Crust Procedure

1. Melt the butter using electric mixer. Add flour and salt. Continue mixing until it resembles coarse crumbs.
2. Add the egg yolk. Knead well to incorporate air. Add miracle fruit juice "cold" as needed and waste miracle fruit pulverized to bind the crust together. For at least an hour, wrap in cheese cloth or "catcha" and place in the fridge.
3. Put some grease the barquette or boat tart molder. Roll the pastry dough out on a board dusted with flour.
4. Placed on top of the boat shaped tart molder removed the excess dough.
5. Place on the rectangular baking tray. Barquette or tart with a pastry shell should be baked for 15 minutes at 350°F. While assembling the miracle fruit filling, remove the baking sheet from the oven and set it out.
6. **Procedure in making Miracle Fruit Juice.**
 1. Cut the miracle fruit into halves using a back saw.

2. Split open then scoop out the flesh of the miracle fruit.
3. Boil on medium fire for 30 minutes.
4. When the miracle fruit turns pitch black, remove from fire.
5. Strain the boiled miracle fruit to separate the juice.
6. Set aside.

Table 1. Costing of Miracle Fruit (*Crescentia cujete*) Barquettes

Ingredients Needed	T1- Miracle Fruit Barquettes (Plain)		T2-Miracle Fruit Barquettes (Tea flavor)		T3-Miracle Fruit Barquettes (Chocolate flavor)		T4-Miracle Fruit Barquettes (Coffee flavor)	
	Amount	Price	Amount	Price	Amount	Price	Amount	Total Price
A. Ingredients								
All Purpose Flour	2 ½ cups	₱ 10.50	2 ½ cups	₱ 10.50	2 ½ cups	₱ 10.50	2 ½ cups	₱ 10.50
Unsalted butter	5 tbsp	₱ 28.50	5 tbsp	₱ 28.50	5 tbsp	₱ 28.50	5 tbsp	₱ 28.50
Salt	3/8 tsp	₱ 0.01	3/8 tsp	₱ 0.01	3/8 tsp	₱ 0.01	3/8 tsp	₱ 0.01
Egg	1 pc	₱ 5.50	1 pc	₱ 5.50	1 pc	₱ 5.50	1 pc	₱ 5.50
Miracle fruit juice	138 ml	₱ 3.25	138 ml	₱ 3.25	138 ml	₱ 3.25	138 ml	₱ 3.25
Sugar	1/8 cup	₱ 1.08	1/8 cup	₱ 1.08	1/8 cup	₱ 1.08	1/8 cup	₱ 1.08
Cornstarch	3/8 tbsp	₱ 1.00	3/8 tbsp	₱ 1.00	3/8 tbsp	₱ 1.00	3/8 tbsp	₱ 1.00
Tea			56 ml	₱ 5.00				
Chocolate					1 tbsp	₱ 4.00		
Condensed milk					56 ml	₱ 28.00		
Coffee							½ tsp	₱ 0.75
B. Packaging								
Glazed paper	1 pc	₱ 7.00	1 pc	₱ 7.00	1 pc	₱ 7.00	1 pc	₱ 7.00
Cartoon pack	8 pcs	₱ 56.00	8 pcs	₱ 56.00	8.75 pcs	₱ 61.25	8 pcs	₱ 56.00
C. Operating Expenses								
Fare	to&fro	₱ 20.00	to&fro	₱ 20.00	to&fro	₱ 20.00	to&fro	₱ 20.00
Gas	0.19 kg	₱ 15.37	0.19 kg	₱ 15.37	0.19 kg	₱ 15.37	0.19 kg	₱ 15.37
Electricity	0.15 kw	₱ 0.87	0.15 kw	₱ 0.87	0.15 kw	₱ 0.87	0.15 kw	₱ 0.87
Water	2 gals	₱ 4.00	2 gals	₱ 4.00	2 gals	₱ 4.00	2 gals	₱ 4.00
Total cost of Production	₱ 153.08		₱ 158.08		₱ 190.33		₱ 153.83	
Mark Up (30%)	₱ 45.92		₱ 47.42		₱ 57.10		₱ 46.15	
Total Cost	₱ 199.00		₱ 205.50		₱ 247.43		₱ 199.98	
Number of yield	32 pcs		32 pcs		35 pcs		32 pcs	
Cost per piece	₱ 6.22		₱ 6.42		₱ 7.07		₱ 6.25	
Cost per Pack	₱ 24.88		₱ 25.68		₱ 28.28		₱ 25.00	
Proposed Selling Price per pack/4 pcs/pk	₱ 25.00		₱ 26.00		₱ 28.50		₱ 25.50	

Miracle Fruit Filling:

1. Boil the miracle fruit juice for ten minutes.
2. Add the flavoring and sugar. Stir until it turns to sticky. Let it cool.
3. Add the egg yolk.
4. Place on top of the barquette or boat tart shell.
5. Bake for 15 minutes. Take it out of the oven when finished, then let it cool.

Meringue Topping:

1. Beat the egg whites with a mixer well.
2. Put the cream of tartar and salt.
3. A tablespoon at a time, add the sugar gently.

4. Meringue needs to be put in a pastry bag or tube. Each miracle fruit-filled barquette will be placed an egg white drizzling by cutting off the tip of the pastry tube or bag and pressing it.
5. Put the miracle fruit barquette back to the oven. Bake for 40 minutes in a moderate oven set to 250°F, or until the meringue topping is cooked and stiff.
6. Remove from the oven, then let cool on racks. Once completed, carefully remove the entire barquette.
7. Wrap with glazed paper individually then place in the final packaging.

Results (findings) and Discussion:

The researcher made the following conclusions after gathering, analyzing, and appropriately interpreting the data:

1. Description of Miracle Fruit (*Crescentia cujete*) Barquettes

1.1. Preparation

The basic ingredients of this product are 2 ½ cup flour, 138 ml miracle fruit juice, 1/8 cup sugar, 2 pcs egg, 56 ml tea, 1 tbsp. chocolate, and ½ tsp. coffee were available in the market and of minimal price. Regarding its costs, it was observed that in every treatment they vary their expenses since it has different flavors.

In terms of costing The miracle fruit barquettes plain had its total cost of (₱153.08) one hundred fifty-three pesos and eight centavos. For the tea flavored barquette, its total cost reached to (₱158.08) one hundred fifty-eight pesos and eight centavos. For the chocolate flavored barquette, the total cost was amounting (₱190.33) one hundred ninety pesos and thirty- three centavos. Lastly for the coffee flavor, the total cost was (₱153.83) one hundred fifty-three pesos and eighty-three centavos. In each production of the barquettes, treatments 1, 2 and 4 yielded 32 pieces while treatment 3 yielded 35 pieces. Thus, the costs per piece were ₱ 6.22 for treatment 0, ₱ 6.42 for treatment 2, ₱ 7.07 for treatment 3, and ₱ 6.25 for treatment 4. The computed costs per pack with four pieces of barquettes were ₱ 24.88 for treatment 1, ₱ 25.68 for treatment 2, ₱ 28.28 for treatment 3, and ₱ 25.00 for treatment 4. With these, the proposed selling price per pack were ₱ 25.00 for treatment 1, ₱ 26.00 for treatment 2, ₱ 28.50 for treatment 3, and ₱ 25.50 for treatment 4. Thus, the miracle fruit barquettes are salable, marketable and affordable by the consumers.

1.1.2. Tools and Equipment

The tools and equipment used in making miracle fruit barquettes were mixing bowl, measuring spoon, measuring cup, rolling pin, wooden ladle, rubber scraper, oven, refrigerator, baking pan, sauce pan, electric mixer, tart pan, pastry bags and tips. These tools and equipment were accessible and available. Aside from that, it can be easily handled and manageable at all times.

1.1.3. Procedure

The procedure in making Miracle Fruit “*Crescentia cujete*” Barquettes involves three processes: First is the processing of crust through baking. Second is preparing the filling by making it like jam texture. Third is making the meringue that serves as garnish and flavor enhancer. The said processes are quiet easy however it needs much time and patience.

1.2 Refrigerated Miracle Fruit (*Crescentia cujete*) Barquettes has a longer life span than at room temperature or unrefrigerated. The shelf life of the four treatments vary with each other because of the different flavorings. The refrigerated Miracle Fruit Barquettes plain last for five months while 4 months for unrefrigerated or at room temperature. For tea flavor it last for 3 months for the refrigerated one while 2.5 months for the unrefrigerated. For the chocolate flavor it reached only for 2.5 months for the refrigerated one while 2 months for the unrefrigerated and lastly the coffee flavor it last for 4 months for the refrigerated one while 3 months for the unrefrigerated miracle fruit barquettes.

2. Significant features of Miracle Fruit Barquette in terms of:

2.1. Proximate Analysis

Based on the result of both Proximate Analysis and Nutrition Facts made by the Department of Science and Technology- Regional Standards and Testing Laboratory, Miracle Fruit Barquettes contain Ash, Crude Protein, Potassium (as K) and Sodium (as Na). Moreover, this product also contains fats and carbohydrates.

In terms of food energy value, treatment 4 Miracle Fruit Barquettes chocolate flavor obtained the highest total caloric content 320kcal. In terms of Total fat treatment 1 Plain and treatment 2 Tea flavor obtained the highest weight content of 12g. In terms of Sodium treatment 4 coffee flavor obtained the highest weight content of 210mg. In terms of total carbohydrates still treatment 4 coffee flavor obtained the highest weight content of 55g. In terms of Protein treatment 3 tea flavor and 4 coffee flavor obtained the highest weight content of 7g. For Potassium all treatments got the 6% of daily value.

2.2. Physico-chemical Analysis

The four treatments of Miracle Fruit (*Crescentia cujete*) Barquettes' Aerobic Plate, Total Coliform, Mold, and Yeast ranged below the standard of microbiological testing for foods, according to the Department of Science and Technology's (DOST) physico-chemical analysis. And it was discovered that the food had been processed hygienically and correctly. Additionally, it was free of poisonous compounds or did not include any substances that were thought to be harmful to health.

3. Acceptability level of the four treatments of Miracle Fruit Barquettes.

3.1. Appearance

Table 2. Summary of the Miracle Fruit Barquettes' Acceptability in Terms of Appearance

N = 90

Sensory Property of Miracle Fruit Barquettes	T1 (Miracle Fruit Barquettes-Plain)		T2 (Miracle Fruit Barquettes-Tea Flavor)		T3 (Miracle Fruit Barquettes-Chocolate Flavor)		T4 (Miracle Fruit Barquettes-Coffee Flavor)	
	W M	Description	W M	Description	W M	Description	W M	Description
A. Appearance								
1. Even thinness of the crust all over its side.	3.66	Highly Acceptable	3.58	Highly Acceptable	3.67	Highly Acceptable	3.61	Highly Acceptable
2. It holds its shape when served.	3.78	Highly Acceptable	3.80	Highly Acceptable	3.80	Highly Acceptable	3.74	Highly Acceptable
3. Light golden brown with darker brown edge.	3.53	Highly Acceptable	3.58	Highly Acceptable	3.67	Highly Acceptable	3.54	Highly Acceptable
4. Rough not smooth looking crust.	3.53	Highly Acceptable	3.57	Highly Acceptable	3.72	Highly Acceptable	3.62	Highly Acceptable
5. Firm pastry based or crust.	3.64	Highly Acceptable	3.70	Highly Acceptable	3.76	Highly Acceptable	3.70	Highly Acceptable
6. Absence of scorch on crust.	3.68	Highly Acceptable	3.73	Highly Acceptable	3.73	Highly Acceptable	3.69	Highly Acceptable
7. Size of the crust in proportion to Barquettes.	3.69	Highly Acceptable	3.78	Highly Acceptable	3.77	Highly Acceptable	3.76	Highly Acceptable
8. Well- proportioned and attractively shaped edges.	3.74	Highly Acceptable	3.77	Highly Acceptable	3.80	Highly Acceptable	3.74	Highly Acceptable
9. Free-standing with firm pastry base.	3.72	Highly Acceptable	3.74	Highly Acceptable	3.73	Highly Acceptable	3.73	Highly Acceptable
10. Acceptable shape for Barquettes.	3.73	Highly Acceptable	3.80	Highly Acceptable	3.84	Highly Acceptable	3.80	Highly Acceptable

Composite Mean	3.67	Highly Acceptable	3.70	Highly Acceptable	3.75	Highly Acceptable	3.69	Highly Acceptable
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Legend: 3.25-4.00 (HA - Higly Acceptable)
2.50-3.24 (MA- Moderately Acceptable)
1.75-2.49(SA -Slightly Acceptable)
1.00-1.74(NA -Not acceptable)

Numerous factors, including product appearance, affect customer product choice. Customers may express practical qualities, obtain a sense of quality, and it has aesthetic and symbolic significance. It can also catch consumers' attention.

Treatment 4 obtained the greatest composite mean of 3.75, which is very much acceptable, while Treatment 1 obtained the lowest composite mean of 3.67, which is still very much acceptable in terms of respondents' overall acceptance of the products' look. This means that the respondents prefer the appearance of each treatment but the consumers preferred most the miracle fruit Barquettes with chocolate flavor and they preferred least the plain miracle fruit Barquettes. The flavors supplement the Barquettes to be more attractive as compared to the plain one.

3.2. Aroma

Table 3. Summary of the Aromatic Acceptability of Miracle Fruit Barquettes
N = 90

Sensory Property of Miracle Fruit Barquettes	T1 (Miracle Fruit Barquettes-Plain)		T2 (Miracle Fruit Barquettes-Tea Flavor)		T3 (Miracle Fruit Barquettes-Chocolate Flavor)		T4 (Miracle Fruit Barquettes-Coffee Flavor)	
	W M	Description	W M	Description	W M	Description	W M	Description
1. Having fragrant pastry.	3.56	Highly Acceptable	3.79	Highly Acceptable	3.76	Highly Acceptable	3.67	Highly Acceptable
2. Aromatic flavour of filling.	3.53	Highly Acceptable	3.76	Highly Acceptable	3.79	Highly Acceptable	3.67	Highly Acceptable
3. Fruity aroma.	3.52	Highly Acceptable	3.70	Highly Acceptable	3.67	Highly Acceptable	3.69	Highly Acceptable
4. Acceptable to one's sense of smell.	3.60	Highly Acceptable	3.70	Highly Acceptable	3.76	Highly Acceptable	3.71	Highly Acceptable
5. Does not show off odor.	3.62	Highly Acceptable	3.71	Highly Acceptable	3.73	Highly Acceptable	3.69	Highly Acceptable
6. Aroma blends the other flavour.	3.61	Highly Acceptable	3.57	Highly Acceptable	3.76	Highly Acceptable	3.77	Highly Acceptable
7. Sweet smelling fragrance.	3.56	Highly Acceptable	3.60	Highly Acceptable	3.78	Highly Acceptable	3.79	Highly Acceptable
8. Fragrance appropriate for Barquettes.	3.60	Highly Acceptable	3.68	Highly Acceptable	3.68	Highly Acceptable	3.69	Highly Acceptable
9. Acceptable to the olfactory bulb.	3.59	Highly Acceptable	3.67	Highly Acceptable	3.79	Highly Acceptable	3.71	Highly Acceptable
10. Scent captures best for mouthfeel.	3.44	Highly Acceptable	3.72	Highly Acceptable	3.74	Highly Acceptable	3.69	Highly Acceptable
Composite Mean	3.56	Highly Acceptable	3.69	Highly Acceptable	3.74	Highly Acceptable	3.71	Highly Acceptable

Legend: 3.25-4.00 (HA - Highly Acceptable)
2.50-3.24 (MA -Moderately Acceptable)

1.75-2.49(SA - Slightly Acceptable)

1.00-1.74(NA - Not acceptable)

The aroma reaches the nose before the food reaches the mouth and the consumer can taste it. Consumers are aware that anything nourishing has a pleasant flavor and aroma. The smell of possibly hazardous food is almost always disagreeable. As much as taste, smell is important for discovering and appreciating food. Before a consumer eats something, their sense of smell analyses it.

Table 3 reveals that the aroma of the Miracle Fruit Barquettes treatment 3 or chocolate flavor got the first rank seconded by treatment 4 or coffee flavor followed by treatment 2 with tea flavor and the fourth one was treatment 1 Miracle Fruit Barquettes plain.

3.3. Taste

Table 4. Summary of the Taste Acceptability of Miracle Fruit Barquettes
N = 90

Sensory Property of Miracle Fruit Barquettes	T1 (Miracle Fruit Barquettes-Plain)		T2 (Miracle Fruit Barquettes-Tea Flavor)		T3(Miracle Fruit Barquettes-Chocolate Flavor)		T4 (Miracle Fruit Barquettes-Coffee Flavor)	
	W M	Description	W M	Description	W M	Description	W M	Description
1. Palatable in taste.	3.62	Highly Acceptable	3.60	Highly Acceptable	3.71	Highly Acceptable	3.67	Highly Acceptable
2. Just enough sweetness of a barquettes.	3.60	Highly Acceptable	3.62	Highly Acceptable	3.67	Highly Acceptable	3.64	Highly Acceptable
3. Blend the taste of miracle fruit juice.	3.61	Highly Acceptable	3.68	Highly Acceptable	3.71	Highly Acceptable	3.67	Highly Acceptable
4. Inviting flavour.	3.40	Highly Acceptable	3.48	Highly Acceptable	3.71	Highly Acceptable	3.68	Highly Acceptable
5. Has enticing taste.	3.43	Highly Acceptable	3.40	Highly Acceptable	3.59	Highly Acceptable	3.64	Highly Acceptable
6. Crust does not overpower taste of filling.	3.53	Highly Acceptable	3.61	Highly Acceptable	3.71	Highly Acceptable	3.64	Highly Acceptable
7. Free from undesirable flavours from other ingredients.	3.57	Highly Acceptable	3.60	Highly Acceptable	3.74	Highly Acceptable	3.68	Highly Acceptable
8. Filling is adequately cooked.	3.56	Highly Acceptable	3.66	Highly Acceptable	3.70	Highly Acceptable	3.70	Highly Acceptable
9. Having delicious taste.	3.42	Highly Acceptable	3.54	Highly Acceptable	3.68	Highly Acceptable	3.66	Highly Acceptable
10. Appetizing flavour.	3.44	Highly Acceptable	3.59	Highly Acceptable	3.72	Highly Acceptable	3.71	Highly Acceptable
Composite Mean	3.52	Highly Acceptable	3.58	Highly Acceptable	3.69	Highly Acceptable	3.67	Highly Acceptable

Legend: 3.25-4.00 (HA -Highly acceptable) 1.75-2.49 (SA -lightly Acceptable)

2.50-3.24 MA -Moderately Acceptable) 1.00-1.74 (NA -Not acceptable)

Taste is the most vital element in culinary arts. A cook always wants to make his food taste good. Humans employ taste to distinguish between healthy and unhealthy foods and to determine the nutritional content of food.

Table 4, The most preferred Miracle Fruit Barquettes in terms of Taste among the four treatments was treatment 3 the chocolate flavor. Treatment 4 coffee flavor got second in rank, treatment 2 tea flavor got the third in rank and treatment 1 plain got the fourth in rank as preferred by the respondents.

3.4. Texture

Table 5. Summary of the Texture Acceptability of Miracle Fruit Barquettes
N = 90

Sensory Property of Miracle Fruit Barquettes	T1 (Miracle Fruit Barquettes-Plain)		T2 (Miracle Fruit Barquettes-Tea Flavor)		T3 (Miracle Fruit Barquettes-Chocolate Flavor)		T4 (Miracle Fruit Barquettes-Coffee Flavor)	
	W M	Description	W M	Description	W M	Description	W M	Description
1. Delicately crisp and flaky	3.53	Highly	3.48	Highly	3.64	Highly	3.58	Highly

when eaten.		Acceptable		Acceptable		Acceptable		Acceptable
2. The filling is a little bit fibrous.	3.43	Highly Acceptable	3.46	Highly Acceptable	3.59	Highly Acceptable	3.56	Highly Acceptable
3. The crust is coarse.	3.53	Highly Acceptable	3.53	Highly Acceptable	3.64	Highly Acceptable	3.62	Highly Acceptable
4. Soft and thick filling.	3.68	Highly Acceptable	3.70	Highly Acceptable	3.83	Highly Acceptable	3.71	Highly Acceptable
5. Moist filling.	3.66	Highly Acceptable	3.69	Highly Acceptable	3.72	Highly Acceptable	3.73	Highly Acceptable
6. Fine crust.	3.66	Highly Acceptable	3.67	Highly Acceptable	3.80	Highly Acceptable	3.68	Highly Acceptable
7. Precise shaped of a Barquettes.	3.67	Highly Acceptable	3.69	Highly Acceptable	3.81	Highly Acceptable	3.73	Highly Acceptable
8. Well-patterned shaped.	3.59	Highly Acceptable	3.73	Highly Acceptable	3.80	Highly Acceptable	3.78	Highly Acceptable
9. Appealing texture.	3.66	Highly Acceptable	3.68	Highly Acceptable	3.81	Highly Acceptable	3.78	Highly Acceptable
10. Acceptable to its quality of a Barquettes.	3.68	Highly Acceptable	3.73	Highly Acceptable	3.70	Highly Acceptable	3.74	Highly Acceptable
Composite Mean	3.61	Highly Acceptable	3.64	Highly Acceptable	3.74	Highly Acceptable	3.69	Highly Acceptable

Legend: 3.25-4.00 (HA - Highly Acceptable) 1.75-2.49(SA - Slightly Acceptable)
2.50-3.24 (MA - Moderately Acceptable) 1.00-1.74(NA - Not acceptable)

One of the most important features people use to judge the quality of food is texture. This characteristic is crucial for the increasing variety of foods. As a result, evaluating texture entails determining how a food reacts to pressures like cutting, shearing, chewing, compressing, or stretching. It also serves as an index of quality.

Table 5 shows the summary of respondents' acceptability towards Miracle Fruit Barquettes in terms of texture. In treatment 1, the parameter "having soft and thick filling" obtained the highest weighted mean of 3.68 which means very much acceptable while the parameter "filling is a little bit fibrous" got the lowest weighted mean of 3.43 which still denotes very much acceptable. The parameters "well-patterned shape" and "acceptable to its quality" in treatment 2 obtained the highest weighted means of 3.73, which are both considered to be highly acceptable, while the parameter "filling is a little bit fibrous" obtained the lowest weighted means of 3.46, which still denotes highly acceptable.

3.5. Overall liking

Table 6. Summary of The Miracle Fruit Barquettes' Acceptability in Terms of Overall Liking
N = 90

Sensory Property of Miracle Fruit Barquettes	T1 (Miracle Fruit Barquettes-Plain)		T2 (Miracle Fruit Barquettes-Tea Flavor)		T3 (Miracle Fruit Barquettes-Chocolate Flavor)		T4 (Miracle Fruit Barquettes-Coffee Flavor)	
	W	Description	W	Description	W	Description	W	Description
1. Desire of another bite of barquettes.	3.57	Highly Acceptable	3.57	Highly Acceptable	3.70	Highly Acceptable	3.69	Highly Acceptable
2. Palatable and enticing.	3.61	Highly Acceptable	3.58	Highly Acceptable	3.70	Highly Acceptable	3.71	Highly Acceptable
3. Delicious and affordable.	3.51	Highly Acceptable	3.56	Highly Acceptable	3.69	Highly Acceptable	3.71	Highly Acceptable
4. Can be stored for more than a month.	3.46	Highly Acceptable	3.54	Highly Acceptable	3.62	Highly Acceptable	3.59	Highly Acceptable
5. Nutritious and boost one's health.	3.73	Highly Acceptable	3.73	Highly Acceptable	3.82	Highly Acceptable	3.78	Highly Acceptable
6. No preservatives.	3.69	Highly Acceptable	3.71	Highly Acceptable	3.79	Highly Acceptable	3.80	Highly Acceptable

7. Unique filling made of miracle fruit.	3.76	Highly Acceptable	3.80	Highly Acceptable	3.78	Highly Acceptable	3.79	Highly Acceptable
8. Sweet smelling fragrance.	3.53	Highly Acceptable	3.61	Highly Acceptable	3.74	Highly Acceptable	3.72	Highly Acceptable
9. Free of unpleasant or distracting flavors.	3.53	Highly Acceptable	3.53	Highly Acceptable	3.68	Highly Acceptable	3.73	Highly Acceptable
10. Acceptable taste of a Barquettes.	3.68	Highly Acceptable	3.67	Highly Acceptable	3.76	Highly Acceptable	3.72	Highly Acceptable
Composite Mean	3.61	Highly Acceptable	3.63	Highly Acceptable	3.73	Highly Acceptable	3.72	Highly Acceptable

Legend: 3.25-4.00 (HA - Highly Acceptable)
2.50-3.24 (MA - Moderately Acceptable)
1.75-2.49(SA - Slightly Acceptable)
1.00-1.74(NA - Not acceptable)

The overall liking represents the whole characteristics of the product. Overall liking is important feature of the products since the consumers were looking into it.

Table 6 shows the overall liking the Miracle Fruit Barquettes chocolate flavor got the first in rank followed by treatment 3 with coffee flavor then treatment 2 with tea flavor got third in rank and treatment 1 which with no flavor added got fourth in rank.

3.6. Packaging

Table 7. Summary of the Packaging Acceptability of Miracle Fruit Barquettes
N = 90

Sensory Property of Miracle Fruit Barquettes	Photo Paper Pouch		Cardboard box with window		Cardboard box		Paper Bag	
	W M	Description	W M	Description	W M	Description	W M	Description
1. Have convenient packaging and can be handled easily by consumers.	3.93	Highly Acceptable	3.88	Highly Acceptable	3.88	Highly Acceptable	3.83	Highly Acceptable
2. The packaging is attractive and fascinating.	3.94	Highly Acceptable	3.83	Highly Acceptable	3.83	Highly Acceptable	3.88	Highly Acceptable
3. The packaging is communicative.	3.94	Highly Acceptable	3.80	Highly Acceptable	3.80	Highly Acceptable	3.72	Highly Acceptable
4. Suitable to the nature of the product.	3.91	Highly Acceptable	3.91	Highly Acceptable	3.87	Highly Acceptable	3.82	Highly Acceptable
5. Economical.	3.91	Highly Acceptable	3.86	Highly Acceptable	3.86	Highly Acceptable	3.88	Highly Acceptable
6. Keeps safe from declining its quality.	3.88	Highly Acceptable	3.88	Highly Acceptable	3.86	Highly Acceptable	3.76	Highly Acceptable
7. It makes adulteration possible.	3.83	Highly Acceptable	3.80	Highly Acceptable	3.80	Highly Acceptable	3.72	Highly Acceptable
8. It increases prestige.	3.87	Highly Acceptable	3.82	Highly Acceptable	3.82	Highly Acceptable	3.70	Highly Acceptable
9. Packaging design protect products from different risks.	3.84	Highly Acceptable	3.83	Highly Acceptable	3.83	Highly Acceptable	3.79	Highly Acceptable
10. Eco friendly.	3.88	Highly Acceptable	3.87	Highly Acceptable	3.87	Highly Acceptable	3.82	Highly Acceptable
Composite Mean	3.89	Highly Acceptable	3.85	Highly Acceptable	3.84	Highly Acceptable	3.79	Highly Acceptable

Legend: 3.25-4.00 (VMA - Highly Acceptable)
2.50-3.24 (MA - Moderately Acceptable)
1.75-2.49(SA - Slightly Acceptable)
1.00-1.74(NA - Not acceptable)

A package provides protection, tampering resistance, and special physical, chemical, or biological needs. It might have a label with the nutrition facts and other details about the food that is being offered. The products' packaging plays a significant role.

Table 7 manifest the summary of the respondents' preferences on the packaging of the Miracle Fruit Barquettes. The photo paper pouch was preferred most by the respondents since it shows the different characteristics of a packaging such as eco-friendly, suitable to the nature of the product, communicative, attractive and fascinating as well as it is convenient and can be handled easily by consumers. Cardboard box with window and Cardboard box ranked second and third since the use of boxes has also many advantages in which they can be recycled, and generally they are also eco-friendly. However, the paper bag ranked the fourth since it was common to the eyes of the consumers and it was not as attractive as compared to the other types of packaging.

4. There was no significant variance in respondents' satisfactoriness between the four treatments of miracle fruit barquettes in terms of appearance. This implies that plain barquette and those with flavor looked similar and equally attractive that the appearance of the four treatments had no significant difference. On the other hand, there was significant variance in acceptability of respondents towards the four treatments in relationships of aroma, taste, texture and overall liking. This means that the flavors added to the barquette significantly improved the aroma, taste and texture of the product as compared to the plain one. Thus, barquettes with flavor were more preferred than the plain one.

Conclusion

The study's findings led the researcher to the conclusion that the miracle fruit barquettes are highly viable to be commercialized and potential source for additional income generation since the products were found marketable and preferred by the consumers.

Recommendation

The researcher came up with the following recommendations based on the study's findings:

1. Parents might encourage their children to eat Miracle Fruit Barquettes in view of the fact that it is nutritious, good for the health and safe from deleterious organisms.
2. Entrepreneurs may put on the market of Miracle Fruit Barquettes as additional income and source of living.
3. Farmers may continue planting the miracle fruit tree to provide the main ingredients in making the product.
4. Instructors may include in the food laboratory activities as part of their product experimentation.
5. Bohol Island State University campuses may publicize the technology guide by conducting an extension program to the community.
6. The Bohol Island State University students may conduct further study about miracle fruit products.
7. For further study, the researcher may include the analysis of the shelf life to have an accurate result.
8. Miracle Fruit "Crescentia cujete" Barquette composition and processes might be subject for patenting to protect the Intellectual Property of the researcher.

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APPENDICES A

DOCUMENTATIONS



Miracle Fruit (*Crescentia cujete*)



Plain



Tea Flavored



Chocolate Flavored



Coffee Flavored

Miracle Fruit (*Crescentia cujete*)
Barquettes in different flavors



Final Packaging of Miracle Fruit
(*Crescentia cujete*) Barquettes