

# Consumer Acceptability and Commercialization of Bamboo Shoot Tart

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**Abstract** Bamboo shoot tart is a type of short crust pastry produced from *Bambusa vulgaris*' juvenile shoot, known as *kiling*. In some distinguished food establishments, Tart is typically eaten as a petit four and not so popular in the public. In order to alleviate food scarcity and at the same time to produce a healthy organic food, the production of bamboo shoot tart can have a practical effect not only for potential investors but also for bamboo farmers. This study was conducted to assess the sensory quality of Bamboo Shoot Tart as perceived by the consumers with the following objectives: (1) to determine the profile of the respondents as to sex, civil status, ethnic affiliation, age, and highest educational attainment; (2) to assess the sensory quality of the developed bamboo shoot tart as perceived by the respondents in terms of appearance, color, texture, aroma, presentation, and taste; (3) to verify if there are significant differences on the sensory evaluation of Bamboo Shoot Tart when respondents are grouped by sex, civil status, ethnic affiliation, age, and highest educational attainment along appearance, color, texture, aroma, presentation, and taste, and (4) to analyze the cost benefit of bamboo shoot products. Data were tabulated, analyzed, and interpreted using frequency, percent, mean, t-test, and ANOVA. The result showed that there are significant differences on the sensory quality of Bamboo Shoot Tart as to color when respondents are grouped by sex and age, as to texture when grouped by ethnic affiliation and along texture and taste when respondents are grouped by highest educational attainment. Ergo, the incorporation of bamboo shoots in a shortcrust

tart is widely acceptable among the different types of consumers.

**Keywords** Bamboo Shoot, Tart, Sensory Evaluation, Appearance, Texture

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## 1. Introduction

Pastry is a dough which can be savoury or sweetened with flour, water and shortening. Sweetened pastries are also defined as the confectionery of bakers. Many types of baked goods made from ingredients such as flour, sugar, milk, butter, shortening, baking powder, and eggs are implied by the term 'pastries.'

It is possible to translate the French word *tarte* into either pie or tart, as both are mainly the same, with the exception of a pie usually covering the pastry filling, whereas flans and tarts leave it open. Tart is a baked dish consisting of a filling over a pastry base with an open top not filled with pastry, according to Davison Allan [1], the Oxford companion to cooking. Typically, tart is a short crust pastry; the filling can be sweet or savory, while modern tarts are usually fruit-based, often sweet or savory.

Bamboo shoot tart is a type of short crust pastry developed from the juvenile shoot known as *kiling* of *Bambusa Vulgaris*. Tart is usually eaten as a petit four in some distinguished food establishments and is not so popular among the public. The production of bamboo shoot

tarts can have a practical effect not only on potential investors but also on bamboo farmers.

According to the study of Choudhury et al. [2], and Tariqa [3], bamboo shoot is low in cholesterol and fat but high in potassium, carbohydrate and dietary fats. The rare kind of this edible bamboo shoots is used in different types of cuisines because it has a matchless taste and flavour. Also, bamboo can be used in manufacturing other products and canned goods [4, 5]. Also, Asian countries utilize bamboo shoots as food and for economic purposes [6].

The consumption and encouragement of indigenous diets could help alleviate malnutrition and mitigate food insecurity in developing countries [7]. Meanwhile, in many ways, bamboo shoots promote health benefits including improving digestion, alleviating hypertension and preventing cardiovascular disease and cancer [8]. Few studies reveal its richness in nutritive components including protein and fiber content and thus the bamboo shoot can be useful to address the problems of malnutrition [9]. Fiber helps to regulate cholesterol levels and plays a part in colon cancer prevention [10]. Several workers have analysed the nutrient compositions of shoots of various edible bamboo plants [11-15]. As a result of its health-promoting effects, bamboo shoots can have a high dietary fiber content, according to Yang [16] et al., Bamboo shoot fibers may have a dry weight of about 40 percent greater than the most widely consumed vegetables. The dietary fiber is mainly insoluble, representing 60-90 percent of their total carbohydrates [17,18]. For decades, bamboo shoots have been used by the tribal world as an ideal vegetable for a healthy diet [19], being low in fat, high in nutrients and abundant in mineral content [20].

Bamboo shoots have been reported as being associated with a variety of health benefits such as antioxidant, anti-free radical, anti-aging, anti-cancer, cardiovascular disease prevention, weight loss, digestive improvement, blood pressure decrease, and anti-microbial activity due to the presence of various flavones, glycosides [21]. There are healthy concentrations of thiamine, niacin, vitamin A, vitamin B6, and vitamin E in the freshly collected bamboo shoots [22,23].

In order to characterize the properties of the bamboo shoot fiber, especially its physiological effects, very limited studies have been done. Extraordinary water and oil binding capacities were shown by dietary fiber isolated from the bamboo shoot, as well as cholesterol and bile acid binding capacities [24]. S. K., according to Tomar. [25], in traditional Asian medicine, bamboo plants play a significant role, especially in China and Japan. Due to the interests of numerous research groups supporting their dietary principles and well-being [26], the utility of bamboo shoots as health foods has been recognized in the recent past.

The HNRDA is aligned with AmBisyon Natin 2040: matatag, maginhawa at panatag na buhay para sa lahat. It has three pillars: Malasakit (enhancing the social fabric), Pagbabago (reducing inequality) and Kaunlaran (increasing potential growth). AmBisyon Natin 2040 and the three pillars form the foundation for more inclusive growth, a high-trust and resilient society and a globally competitive knowledge economy. Bamboo was identified as one of the priority products including its young culm [27].

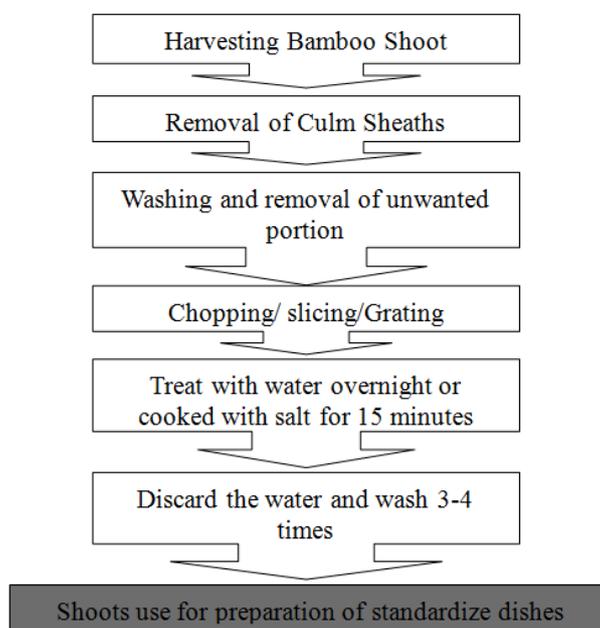
Previous studies on bamboo shoots have been reported and cited, but still a lot more products are waiting to be produced in order to exploit the prospective of bamboo and to respond to the harmonized national research and development agenda of 2017-2022 by governments. Because of the health benefits of bamboo shoots discussed, a new trend in the promotion of bamboo shoot products is then conceptualized by infusing these raw materials as a primary ingredient in the production of bamboo shoot tart and other types of pastries, bread and cakes.

The shelf life of bamboo shoots is limited and must be sold immediately after harvesting. They are sold in different processed shapes and are available in versions that are fresh, dried, fermented, pickled and canned [28]. Due to seasonal availability of bamboo shoots, processing for handling cytogenic toxicity in raw shoots while keeping nutrients intact and enhancement of shelf life of the value-added products assume great significance for business potential [29]. Clean-label specialist Ulrick and Short is producing a flexible fiber that has potential for the gluten-free market, harvested from bamboo shoots. The supplier of ingredients said that for bakery applications, the bamboo fiber had good potential, including the prolongation of shelf-life, which may assist producers to increase profits in the gluten-free area [30].

## 2. Objectives of the Study

The study was conducted (1) to determine the profile of the respondents in terms of sex, civil status, ethnic affiliation, age, and highest educational attainment; (2) to assess the sensory quality of the developed bamboo shoot tart as perceived by the respondents in terms of appearance, color, texture, aroma, presentation, and taste; (3) to verify if there are significant differences on the sensory evaluation of Bamboo Shoot Tart when respondents are grouped by sex, civil status, ethnic affiliation, age, and highest educational attainment along appearance, color, texture, aroma, presentation, and taste and; (4) to determine the cost benefit analysis and calorie content evaluation of bamboo shoot tart.

### 3. Methodology



**Figure 1.** Processing and preservation techniques for bamboo shoots

**Table 1.** Preparation of Bamboo shoot

Materials	
Oven	Baking pans
Spatula	Wire Whisk
Mixing Bowl	Tart Molder
Utility bowls	Knife
Baking sheet	
Ingredients	
For the Crust	For the Tart Filling
140g Butter	1 pc. Egg
1 pc. Egg	1/2 cup White Sugar
1/2 cup confectioners powdered sugar	1/3 cup maple syrup or corn syrup
1 cup plain flour	1tbsp. Melted Butter
1/2 cup bamboo shoot powder	1/2 tsp. Vanilla extract
Pinch of salt	1 cup finely shredded bamboo shoot
Procedure	
Mix sifted flour, bamboo shoot powder, icing sugar, salt, butter and egg in a bowl until dough and kneading is finished. Sprinkle the work area with some flour and knead it to form a ball and wrap it in a film that clings.	
For around 25 to 30 minutes, refrigerate the dough or until it is workable.	
Combine all the filling ingredients for 10 minutes or until they become sticky, then set aside to make the bamboo shoot filling.	
Preheat the oven to 180C (350F).	
Cut 24 equal portions when the dough is ready and flatten each pastry ball on a flour and put each dough on a prepared tart mould.	
By circular motion, press dough in the molder, use your thumbs and clean up the edges with your index fingers.	
To get rid of air pockets and keep the dough from shrinking while baking, poke the dough with a fork.	
Prepare the filling and pour on each mold around 2/3's complete.	
Place bamboo shoot tarts on a baking tray and bake for around 20-25 minutes in a preheated oven or until the pastry becomes light brown and the filling becomes firm.	
Remove tarts from the oven and allow them to cool completely before removing them from the molder to avoid cracking.	
If needed, you can wrap it in any colored cellophane or store it in an airtight jar.	

### Statistical Treatment of Data

In evaluating the sensory quality of Bamboo Food Tart as to appearance, color, texture, aroma, presentation, and taste, a four-point Likert was used which is as follows:

Scale	Range	Indicator
4	3.25 - 4.00	The respondent likes the quality of the product to the maximum level.
3	2.50 - 3.24	The respondent likes the quality of the product to a high extent.
2	1.75 - 2.49	The respondent likes the quality of the product to an average extent.
1	1.00 - 1.74	The respondent likes the quality of the product to a less extent.

### Statistical Tools Used

Data were tabulated, analyzed, and interpreted using the following tools:

**Frequency and Percent.** These were utilized to determine the profile of the respondents as to sex, civil status, ethnic affiliation, age, and highest educational attainment.

**Mean.** This was used to assess the sensory quality of Bamboo Shoot Tart as perceived by the respondents.

**t-test.** This was utilized to find out if there are significant differences on the sensory evaluation of Bamboo Shoot Tart when respondents are grouped by sex, civil status, and highest educational attainment.

**ANOVA.** This was used to verify if there are significant differences on the sensory evaluation of the respondents as to ethnic affiliation and age.

**RESULTS AND DISCUSSIONS** This chapter presents the frequency distribution of the respondents, mean sensory evaluation of Bamboo Shoot Tart, and the tests of significant differences on the mean sensory evaluation of the product when respondents are grouped by profile.

### Profile of the Respondents

**Table 2.** Frequency Distribution of the Respondents as to Profile

PROFILE	PARTICULARS	FREQUENCY
Sex	Male	35
	Female	65
Civil Status	Married	7
	Single	93
Ethnic Affiliation	Tagalog	13
	Ilocano	60
	Ifugao	18
	Yogad/Bago/Igorot	9
Age (in years)	17 – 19	42
	20 – 22	49
	23 and above	9
Highest Educational Attainment	College Level	90
	High School Level/ Master Degree Holder	10

n = 100

Table 2 shows the frequency distribution of the 100 respondents as to profile. As revealed, 35 respondents are male while 65 are female. In terms of civil status, seven (7) are married and 93 respondents are single. As to ethnic affiliation, 13 are Tagalog, 60 are Ilocano, 18 are Ifugao, and nine (9) respondents are Bago, Yogad and Igorot. In terms of age, 42 respondents are 17 – 19 years old, 49 are 20 – 22 years old, and nine (9) are 23 years old & above. As to highest educational attainment, 90 respondents are in College and 10 are in high school or Master Degree Holder.

Based on the table, most of the respondents are female, single, Ilocano, 20 – 22 years old, and in college.

### Mean Sensory Evaluation of Bamboo Shoot Tart

**Table 3.** Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Sex and Civil Status

Item	n = 100		Sex				Civil Status			
			Male		Female		Married		Single	
	Mean	Description	Mean	Description	Mean	Description	Mean	Description	Mean	Description
Appearance	3.18	LVM	3.18	LVM	3.18	LVM	3.18	LVM	3.18	LVM
Color	3.31	LE	3.20	LVM	3.37	LE	3.20	LVM	3.37	LE
Texture	3.09	LVM	3.20	LVM	3.03	LVM	3.20	LVM	3.03	LVM
Aroma	3.10	LVM	3.91	LE	3.20	LVM	2.91	LVM	3.20	LVM
Presentation	3.25	LE	3.00	LVM	3.38	LE	3.00	LVM	3.38	LE
Taste	3.64	LE	3.57	LE	3.68	LE	3.57	LE	3.68	LE

Legend: 3.25 - 4.00 Like Extremely (LE) 2.50 - 3.24 Like Very Much (LVM) 1.75 - 2.49 Like Moderately (LM) 1.00 - 1.74 Like Slightly (LS)

Table 3 reveals the mean sensory evaluation of the Bamboo Shoot Tart among 100 respondents in general and when grouped by sex and civil status. As shown, the items, appearance, texture, and aroma are described as Like Very Much. On the other hand, the items color, presentation, and taste have a description of Like Extremely. This means that the respondents like Bamboo Shoot Tart very much as to appearance, texture, and aroma. However, the respondents like Bamboo Shoot Tart extremely as to color, presentation, and taste.

As to sex and civil status, the descriptions for male and female correspond to the descriptive equivalents for married and single respondents, respectively as to appearance, color, texture, presentation, and taste. Moreover, aroma is described as Like Very Much for female, married and single respondents. On the other hand, aroma for male has a description of Like Extremely. This explains that the respondents like Bamboo Shoot Tart very much as to appearance, texture and extremely like the product in terms of taste when grouped by sex and civil status. Male and married respondents like Bamboo Shoot Tart very much while female and single respondents extremely like the product as to color and presentation. Female, married, and single respondents like Bamboo Shoot Tart very much and male respondents extremely like Bamboo Shoot Tart in terms of aroma.

**Table 3a.** t-test on the Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Sex

Item	t-computed	p-value	Decision
Appearance	2.047	.156	Accept Ho
Color	4.723*	.032	Reject Ho
Texture	.954	.331	Accept Ho
Aroma	.535	.466	Accept Ho
Presentation	.110	.741	Accept Ho
Taste	.442	.508	Accept Ho

p-value of .05 and below are significant and above .05 are not significant

T-test on the mean sensory evaluation of Bamboo Shoot Tart when respondents are grouped by sex is shown in Table 3a. As revealed, only the item color is found to have a significant result which implies that the mean sensory evaluation of Bamboo Shoot Tart varies between male and female respondents as to color.

**Table 3b.** t-test on the Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Civil Status

Item	t-computed	p-value	Decision
Appearance	1.048	.309	Accept Ho
Color	1.401	.239	Accept Ho
Texture	1.521	.220	Accept Ho
Aroma	.501	.481	Accept Ho
Presentation	.003	.960	Accept Ho
Taste	.126	.723	Accept Ho

Table 3b reveals the t-test on the mean sensory evaluation of Bamboo Shoot Tart when respondents are grouped by civil status. Based on the table, no item is found to have a significant result. Thus, the mean sensory evaluation of Bamboo Shoot Tart does not differ between married and single respondents as to appearance, color, texture, aroma, presentation, and taste.

**Table 4.** Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Ethnic Affiliation

Item	Tagalog		Ilocano		Ifugao		Bago/Yogad/Igorot	
	M	D	M	D	M	D	M	D
Appearance	2.77	LVM	3.20	LVM	3.28	LE	3.44	LE
Color	3.23	LVM	3.28	LE	3.39	LE	3.44	LE
Texture	3.23	LVM	3.12	LVM	2.67	LVM	3.56	LE
Aroma	2.85	LVM	3.23	LVM	2.83	LVM	3.11	LVM
Presentation	2.92	LVM	3.38	LE	3.11	LVM	3.11	LVM
Taste	3.85	LE	3.62	LE	3.44	LE	3.89	LE

The mean sensory evaluation of Bamboo Shoot Tart when respondents are grouped by ethnic affiliation is shown in Table 4. As revealed, the item taste for Tagalog; the items color, presentation, and taste for Ilocano; the items appearance, color, and taste for Ifugao; and the items appearance, color, texture, and taste for Bago, Yogad, and Igorot are described as Like Extremely. This means that Tagalog respondents like Bamboo Shoot Tart extremely as to taste; Ilocano along color, presentation, and taste; Ifugao as to appearance, color, and taste; and Bago, Yogad, and Igorot along appearance, color, texture, and taste.

**Table 4a.** ANOVA on the Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Ethnic Affiliation

Item	F-computed	p-value	Decision
Appearance	1.310	.276	Accept Ho
Color	.203	.894	Accept Ho
Texture	2.887*	.040	Reject Ho
Aroma	1.549	.207	Accept Ho
Presentation	1.291	.282	Accept Ho
Taste	1.101	.353	Accept Ho

ANOVA on the mean sensory evaluation of Bamboo shoot Tart when respondents are grouped by ethnic affiliation is presented in Table 4a. As shown, only the item "texture" has a significant result, which implies that the mean sensory evaluation of Bamboo shoot Tart differs among the respondents as to texture.

**Table 5.** Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Age

Item	17 – 19		20 – 22		23 and above	
	Mean	Description	Mean	Description	Mean	Description
Appearance	3.29	LE	3.16	LVM	2.78	LVM
Color	3.57	LE	3.16	LVM	2.89	LVM
Texture	3.24	LVM	3.06	LVM	2.56	LVM
Aroma	3.24	LVM	3.02	LVM	2.89	LVM
Presentation	3.40	LE	3.20	LVM	2.78	LVM
Taste	3.74	LE	3.57	LE	3.56	LE

Table 5 shows the mean sensory evaluation of Bamboo Shoot Tart when respondents are grouped by age. Based on the table, the items appearance, color, presentation, and texture for 17 – 19 years old; and the item taste for 20 – 22 and 23 years old & above are described as Like Extremely. This means that the respondents who are 17 – 19 years old like Bamboo Shoot Tart extremely as to appearance, color, presentation, and texture; and the respondents who are 20 – 22 and 23 years old & above like Bamboo Shoot Tart extremely along taste.

**Table 5a.** ANOVA on the Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Age

Item	F-computed	p-value	Decision
Appearance	1.257	.289	Accept Ho
Color	4.628*	.012	Reject Ho
Texture	2.734	.070	Accept Ho
Aroma	1.087	.341	Accept Ho
Presentation	2.0853	.134	Accept Ho
Taste	.624	.538	Accept Ho

Table 5a reveals the ANOVA on the mean sensory evaluation of Bamboo Shoot tart when respondents are grouped by age. As shown, only the item “color” is found to have a significant result. This implies that the mean sensory evaluation of Bamboo Shoot Tart differs among 17 – 19, 20 – 22, and 23 years old & above as to color.

**Table 6.** Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Highest Educational Attainment

Item	College Level		High School/Master Degree Holder	
	Mean	Description	Mean	Description
Appearance	3.22	LVM	2.80	LVM
Color	3.33	LE	3.10	LVM
Texture	3.14	LVM	2.60	LVM
Aroma	3.10	LVM	3.10	LVM
Presentation	3.24	LVM	3.30	LE
Taste	3.61	LE	3.90	LE

The mean evaluation of Bamboo Shoot Tart when respondents are grouped by highest educational attainment, the respondents’ mean evaluation of Bamboo Shoot Tart is revealed in Table 6. As presented, the items color and taste for college level and the items presentation and taste for high school level and Master Degree Holder have a description of Like Extremely. Thus, college level respondents like Bamboo shoot Tart extremely as to color and taste. On the other hand, the respondents who are in high school and Master Degree Holder like the product extremely along with presentation and taste.

**Table 6a.** t-test on the Mean Sensory Evaluation of Bamboo Shoot Tart when Respondents are Grouped by Highest Educational Attainment.

Item	t-computed	p-value	Decision
Appearance	.082	.775	Accept Ho
Color	3.245	.075	Accept Ho
Texture	10.309*	.002	Reject Ho
Aroma	.302	.584	Accept Ho
Presentation	.440	.509	Accept Ho
Taste	5.902*	.017	Reject Ho

Table 6a presents the t-test on the mean sensory evaluation of Bamboo shoot Tart when respondents are grouped by highest educational attainment. Based on the table, the items “texture” and “taste” have significant results. Thus, the null hypothesis is rejected, which implies that the mean sensory evaluation of Bamboo Shoot Tart varies between college level and high school level/Master Degree Holder along texture and taste.

**Table 7.** Cost benefit Analysis of bamboo shoot tart

Ingredients	Quantity	Unit Price (Php)
For the crust		
butter	140g	55.00
egg	1	5.00
confectioners powdered sugar	½ cup	20.00
plain flour	1 cup	10.00
bamboo shoot powder	½ cup	10.00
salt	pinch	1.00
For the filling		
egg	1 ½	10.00
sugar	½ cup	10.00
maple syrup or corn syrup	1/3 cup	15.00
melted butter	1 tbsp.	2.00
vanilla extract	½ tsp.	1.00
finely shredded bamboo shoot	1 cup	10.00
TOTAL EXPENSES		149.00

**Table 8.** Nutrient Content of bamboo shoot tart

Product	Quantity	Total
Bamboo Shoot Tart	24 x 12	288.00
Expenses		149.00
Gross Income		Php 139.00

The nutrition content analysis is useful if you're tracking calories or just want to be more informed about your diet. It is also helpful in making smarter food decisions [31].

**Table 8a.** Estimated energy and nutrient content per serving of Bamboo Shoot Tart

Nutrition Facts	
Servings: 24	
Amount per serving	
Calories	111
% Daily Value*	
Total Fat 5.7g	7%
Saturated Fat 3.3g	17%
Cholesterol 33mg	11%
Sodium 53mg	2%
Total Carbohydrate 14.1g	5%
Dietary Fiber 0.3g	1%
Total Sugars 9.6g	
Protein 1.5g	
Vitamin D 5mcg	26%
Calcium 9mg	1%
Iron 0mg	2%
Potassium 71mg	2%
*The % Daily Value (DV) tells you how much a nutrient in a food serving contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

Nutrient	Content	RENI	%RENI
Energy (kcal)	111	2530	4
Protein (g)	1.5	71	2
Fat (g)	5.7	-	-
Carbohydrates (g)	14.1	-	-
Calcium (mg)	9	750	1
Iron (mg)	0	12	2
Vitamin D	5	700	26

The table reveals the results of Menu Analysis of bamboo shoot tart. The table shows that 1 serving of the product contains 111 calories, 1.5g of protein, 5.7 grams fat, 14.1 carbohydrates, 9 mg calcium, and 71mg potassium.

## 4. Discussion

This study was conducted to assess the sensory quality of Bamboo Shoot Tart as perceived by the consumers with the following objectives: (1) to determine the profile of the respondents as to sex, civil status, ethnic affiliation, age,

and highest educational attainment; (2) to assess the sensory quality of the developed bamboo shoot tart as perceived by the respondents in terms of appearance, color, texture, aroma, presentation, and taste; and (3) to verify if there are significant differences on the sensory evaluation of Bamboo Shoot Tart when respondents are grouped by sex, civil status, ethnic affiliation, age, and highest educational attainment along appearance, color, texture, aroma, presentation, and taste. Data were tabulated, analyzed, and interpreted using frequency, percent, mean, t-test, and ANOVA.

The highlights of the study are as follows: thirty five (35) respondents are male while 65 are female. In terms of civil status, seven (7) are married and 93 respondents are single. As to ethnic affiliation, 13 are Tagalog, 60 respondents are Ilocano, 18 are Ifugao, and nine (9) are Bago, Yogad and Igorot. In terms of age, 42 respondents are 17 – 19 years old, 49 are 20 – 22 years old, and nine (9) are 23 years old & above. As to highest educational attainment, 90 are in college and 10 are in high school or Master Degree Holder.

In general, the items appearance, texture, and aroma are described as Like Very Much. Meanwhile, the items color, presentation, and taste have a description of Like Extremely. As to sex, the items appearance, color, texture, and presentation for male and the items appearance, texture, and aroma for female have a description of Like Very Much.

On the other hand, the items aroma and taste for male and the items color, presentation, and taste for female are described as Like Extremely. In terms of civil status, the items appearance, color, texture, aroma, and presentation for married and the items appearance, texture, and aroma for single are described as Like Very Much while the item taste for married and the items color, presentation, and taste for single have a description of Like Extremely.

As to ethnic affiliation, the item taste for Tagalog; the items color, presentation, and taste for Ilocano; the items appearance, color, and taste for Ifugao; and the items appearance, color, texture, and taste for Bago, Yogad, and Igorot are described as Like Extremely. In terms of age, the items appearance, color, presentation, and texture for 17 – 19 years old; and the item taste for 20 – 22 and 23 years old & above are described as Like Extremely.

As to highest educational attainment, the items color and taste for college level and the items presentation and taste for high school level and Master Degree Holder have a description of Like Extremely. Thus, college level respondents like Bamboo shoot Tart extremely as to color and taste. On the other hand, the respondents who are in high school and Master Degree Holder like the product extremely along with presentation and taste.

There are significant differences on the sensory quality of Bamboo Shoot Tart as to color when respondents are grouped by sex and age; as to texture when grouped by ethnic affiliation; and along texture and taste when respondents are grouped by highest educational attainment.

## 5. Conclusions and Future Works

Most of the respondents are female, single, Ilocano, 20 – 22 years old, and in college. The respondents like Bamboo Shoot Tart very much along with appearance, texture, and aroma. However, the respondents like Bamboo Shoot Tart extremely as to color, presentation, and taste. As to sex, this implies that male respondents like Bamboo Shoot Tart very much as to appearance, color, texture, and presentation and female respondents like the product very much along appearance, texture, and aroma. However, male respondents like Bamboo Shoot Tart extremely as to aroma and taste while female respondents like the product extremely along color, presentation, and taste. In terms of civil status, married respondents like Bamboo shoot Tart very much along appearance, color, texture, aroma, and presentation and single respondents like the product very much as to appearance, texture, and aroma.

However, married respondents like Bamboo Shoot Tart extremely as to taste while single respondents like the product extremely along color, presentation, and taste. In terms of ethnic affiliation, Tagalog respondents like Bamboo Shoot Tart extremely as to taste; Ilocano along color, presentation, and taste; Ifugao as to appearance, color, and taste; and Bago, Yogad, and Igorot along appearance, color, texture, and taste. In terms of age, the respondents who are 17 – 19 years old like Bamboo Shoot Tart extremely as to appearance, color, presentation, and texture; and the respondents who are 20 – 22 and 23 years old & above like Bamboo Shoot Tart extremely along taste.

The sensory quality of Bamboo Shoot Tart varies as to color when respondents are grouped by sex and age. The sensory quality of the product differs among ethnic groups on texture. Moreover, the sensory quality of Bamboo Shoot Tart varies between college level and high school level/Master Degree Holder.

This study has limits on the analysis of its shelf-life. It is then recommended to the next researcher to determine the shelf life and the microbial analysis to further improve the product. It is also recommended for researchers to combine with qualitative studies to give a more comprehensive and in-depth picture to develop bamboo shoot products to respond to the government's initiative to create and develop products as a way to mitigate poverty in the province. The result of the cost benefit analysis is also promising and has potential for product commercialization.

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