

Development and Acceptability of Macaroons with Shoots from Different Species of Bamboo



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ABSTRACT: The study focused on the development and acceptability of macaroons made from different varieties of bamboo shoots with four flavorings. This product development research includes two major areas: preparation of bamboo shoots, and preparation of twelve type macaroons using the bamboo shoots in four different flavors. To further appreciate the developed macaroons, the researcher investigated the acceptability of the products in terms of appearance, aroma, taste, and texture, and in terms of the sensorial evaluation of bamboo shoot macaroons flavored with corn syrup, corn kernel, honey and latik along with the following age groups: children, teenagers, adults and experts. The evaluators were randomly chosen. The statistical tools utilized in this study were mean, standard deviation, and One-way between Groups Analysis of Variance (ANOVA) with Pos Hoc Analysis Using Tukey HSD when a significant difference was revealed based on the result of ANOVA. A five-point Likert scale was used in the determination of the evaluators' rating.

Results of this study revealed that all twelve developed macaroons from Bayog, Kawayan Killing, and Kawayan Tinik bamboo shoots each flavored with Corn Syrup, Corn Kernel, Honey and Latik were "highly acceptable". All different varieties of macaroons were highly acceptable in general in terms of appearance, aroma, taste, and texture.

The different varieties of macaroons were also "highly acceptable" in general according to the evaluators' age group with the highest total mean for macaroons from Kawayan Tinik flavored with Latik while the lowest for macaroons from Bayog with Honey. Meanwhile, significant difference was found in the general acceptability of the macaroons as perceived by the evaluators when grouped according to their age group. The significant differences exist between children and experts for macaroons from Bayog with Corn Syrup, Bayog with Corn Kernel, Bayog with Honey, Kawayan Killing with Corn Syrup, Kawayan Killing with Latik, and Kawayan Tinik with Corn Syrup, while between the children, teenagers, and experts for macaroons made from Kawayan Tinik flavored with Honey.

The nutritive content of the developed bamboo shoot macaroons has a greater amount of carbohydrates, a good source of energy giving food. It is also heart friendly and it helps to control bad cholesterol throughout the body because the developed bamboo shoot macaroons are low in fat content and contain considerable amount of protein the body needs.

Finally, the shelf-life of bamboo shoot macaroons when stored in normal temperature can last for six days and when stored in cold temperature, the bamboo shoot macaroons can last for ten days.

KEYWORDS: Bamboo shoot, Macaroons, Acceptability, Organic Food and Development

I. INTRODUCTION

Development of nutritious food products provides everyone with specific health benefits. Everybody wants to live a healthier lifestyle. Development drives innovation and constant renovation of our food. Discovering or introducing new products to everyone is a challenging one, from its formula, ingredients, flavoring, shelf life and packaging. Developing new product involves assembling and analyzing a proto-type of the product to see how the ingredients interact, and to balance the technical realities of the product with its market goals. Developing nutritious food from products which are locally available in the market would combat or address issues on malnutrition. This is also to avoid temptation to eat unhealthy foods like junk foods.

Shifting to organic food is essential in maintaining healthy body. It is generally free of pesticides and chemical crops, and has minimal additives. According to the Organic Trade Association, organic foods are processed minimally and are free from artificial ingredients and preservatives "to maintain the integrity of the food". Preservatives are recent addition to the human diet, and organic food represents a shift back to older practices.

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Bamboos belonging to family Poaceae are considered as one of the most versatile multi utility forest tree grasses with over 1,250 species, their presence are predominantly found in Southeast Asia. They are known to have more than 1500 uses and are considered as one of the most economically important plants in the world. The applicability of bamboos is highly diverse as they are employed immensely in paper, handicraft industry, house construction and making furniture, water pipes, storage vessels and other important household items.

People from different countries address bamboos in different names because of their highly multipurpose properties. The Chinese called bamboos as “Friends of the People”, Vietnamese as “My Brothers” and Indians as “Greek Gold”. Nongdam and Tikendra (2014). Bamboos in addition to their multiple applications have another important usage in utilizing their juvenile shoots as popular food items that can be consumed fresh, fermented or canned. The juvenile shoots are not only delicious but of high content of proteins, amino acids, minerals, fiber, carbohydrates and low in fats and sugar. The presence of photosynthesis in young shoots provides youthful feeling, athletic energy and longevity to regular consumers. The shoots are free from residual toxicity and grow without the application of fertilizers. Modern research has revealed that juvenile shoots of bamboo have a greater number of health benefits like healthy weight loss, control of bad cholesterol, strengthening the immune system, possible cancer fighting properties and anti-inflammatory properties. Furthermore, shoots have antioxidant capacity due to the presence of phenolic compounds. Moreover, bamboo shoots contain significant amount of dietary fiber that can be used as an ingredients for bakery products, meat products, snacks, pastas, desserts, cookies and many other food products.

The properties of bamboo shoots were documented in the book Compendium of Materia Medica, a pharmaceutical text written during the Ming dynasty (1368 to 1644), with following words “ Slightly called sweet, nontoxic, and it quenches thirst, benefits the liquid circulatory systems and can be served as a daily dish” (Yuming and Jiru,1999). Presently, bamboo shoots are consumed as vegetable by local people. It serves as a delicacy in up- scale markets. Most bamboo shoots produce edible shoots but only few are commonly grown on utilized for their shoots (Midmore, 1998).

It is for this reason that the researcher was motivated and interested to further explore and develop localized bamboo shoots products that can be popularly served and appreciated on the table by locals both children and adults because of its nutritive value.

II. MATERIALS AND METHODS

The following tools, equipment and ingredients were used in the conduct of the study.

Table 1. Tools and Equipment Used in the Conduct of the Study.

DESCRIPTION					
Preparation tools	Measuring tools	Mixing tools	Cutting tools	Baking pans	Equipment
Flour Sifter	Measuring cups	Mixing bowls	Knife	Macaroon molder	Gas range
Grater	Glass measuring	Wooden spoon	Chopping board		Oven
Spatula	Measuring spoon				Gas stove
Utility tray					

Ingredients

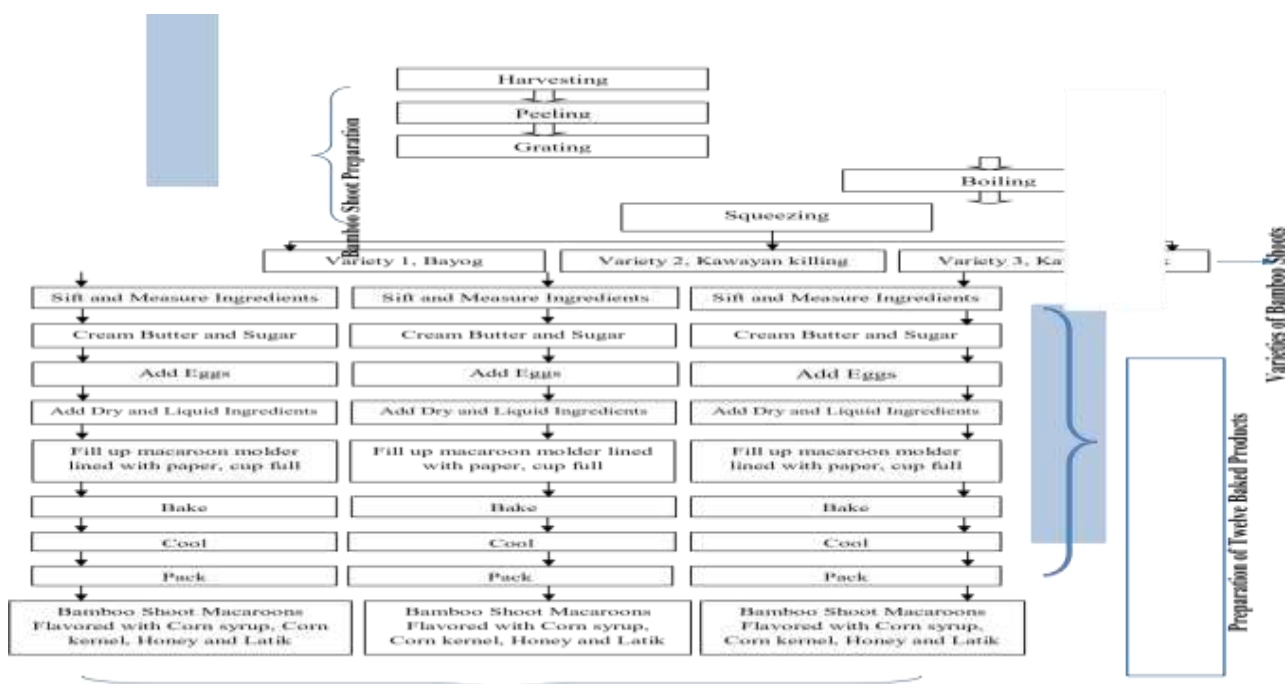
Table 2. Proportion of Ingredients used in the Preparation of Four Flavored Macaroons from the Three Varieties of Bamboo Shoots.

Flavoring Ingredients	Corn Syrup F1	Corn Kernel F2	Honey F3	Latik (Coconut curd) F4
Corn syrup, Corn kernel, Honey, Latik ©	¼	¼	¼	¼
Grated Bamboo shoot ©	2	2	2	2
Powdered Milk ©	1 ½	1 ½	1 ½	1 ½
Refined Sugar ©	1	1	1	1
Cake Flour ©	¾	¾	¾	¾
Egg yolk (pc)	1	1	1	1
Condensed Milk (ml.)	168	168	168	168
Butter (g)	100	100	100	100
Water ©	½	½	½	½

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Developmental Procedure

In order to perform the research properly, the flowchart of the procedures in making flavored bamboo shoot macarons out of Corn Syrup, Corn Kernel, Honey and Latik, were followed consistently. The needed materials and ingredients were prepared; followed by creaming and mixing the major ingredients then poured into prepared macaroon molder, then baked, cooled and packed.



Sensory Evaluation

The finished products were subjected to sensory evaluation. One hundred twenty (120) varied age group of evaluators: 30 children, 30 teenagers, 30 adults and 30 food experts from selected bakery owners (e. g. Calamagui Bakery) of Ilagan City, Isabela, students and faculty and staff of the Isabela State University, Ilagan Campus, as well as selected food technology teachers of Isabela School of Arts and trades and Barangay Calamagui 2nd City of Ilagan, Isabela. They were randomly selected and properly oriented on what and how to evaluate the products using the score card depicting the sample code. The different flavors of bamboo shoot macarons were served on the table. Each respondent was asked to taste the samples of each product. Data on the appearance/color, aroma, taste and texture of each product were collected and subjected to statistical analysis.

The instrument used for gathering was a score sheet using quantitative analysis method in determining the acceptability of the product.

The responses as to the level of acceptability of the flavored bamboo shoots macarons in terms of appearance/color, aroma, taste, and texture were solicited using the five-point Likert's scale and given weight for computation.

Scale	Numeric Rating	Descriptive Rating
5	4.50-5.00	Highly Acceptable
4	3.50-4.49	Moderately Acceptable
3	2.50-3.49	Acceptable
2	1.50-2.49	Slightly Acceptable
1	0.50-1.49	Not Acceptable

Statistical Tools Used

All data were gathered from the questionnaire/evaluation form given to the evaluators. The variables were analyzed and interpreted based on the output of the Statistic Package for Social Science Software.

1. Mean (M) was utilized to gauge the level of acceptability of the macarons as to respondents' age groups and criteria used.
2. Standard Deviation (SD) was utilized to determine the homogeneity or average distance and the level of acceptability scores around the mean.
3. One Way Between Groups Analysis of Variance (ANOVA) was utilized to determine the differences of the level of general acceptability of the macarons across the four age groups.

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4. Pos Hoc Analysis Using Tukey HSD. This was conducted only when the ANOVA revealed a significant difference between and among the level of general acceptability of the macaroons across the four age groups. This was utilized to determine which among the pairs of groups have significantly different level of general acceptability for the macaroons.

Product Evaluation

Table 3.1. Level of Acceptability of Macaroons from Bayog with Corn Syrup

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.85	.40	Highly Acceptable
Aroma	4.86	.36	Highly Acceptable
Taste	4.88	.32	Highly Acceptable
Texture	4.80	.47	Highly Acceptable

The table above shows the acceptability of macaroons from Bayog with corn syrup. It reflects a highly acceptable level of acceptability indicating their respective weighted means of 4.85, 4.86, 4.88 and 4.80. It implies that the product has a pleasing appearance and texture. Likewise, the taste of “Bayog” macaroon with corn syrup is palatable. Furthermore, the corn syrup contributed to increase the delightful aroma and sweetness of the developed product which makes it very much acceptable to children. This conforms to the study of Matibag on the acceptability of macaroons made of varying levels of bamboo shoot when it revealed that the general appearance, flavor, taste and texture were “very much liked” by the evaluators.

Table 3.2 Level of Acceptability of Macaroons from “Bayog” with Corn Kernel

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.90	.32	Highly Acceptable
Aroma	4.89	.31	Highly Acceptable
Taste	4.90	.30	Highly Acceptable
Texture	4.85	.40	Highly Acceptable

Table 3.2. Exhibits the level of acceptability of macaroons made from “Bayog” with corn kernel as perceived by the evaluators. It is evident from the table that the appearance, aroma, taste, and texture were all assessed by the respondents as “highly acceptable” indicating their respective weighted means of 4.90, 4.89, 4.90, and 4.85. This means that the respondents accept very much the appearance, aroma, savory, and texture of the macaroons from “Bayog” with Corn Kernels.

Table 3.3. Level of Acceptability of Macaroons from Bayog with Honey.

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.82	.44	Highly Acceptable
Aroma	4.85	.42	Highly Acceptable
Taste	4.86	.38	Highly Acceptable
Texture	4.81	.42	Highly Acceptable

The table exhibits the level of acceptability of macaroons made from “Bayog” with honey. It is evident from the table that the appearance, aroma, taste and texture of the developed product were all assessed by the respondents as “highly acceptable” indicating their weighted means of 4.82, 4.85, 4.86, and 4.81. This means that respondents accept very much the appearance, aroma, taste and texture of the macaroons from the “Bayog” with Honey.

Table 3.4. Level of Acceptability of Macaroons from Bayog with Latik

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.87	.35	Highly Acceptable
Aroma	4.88	.32	Highly Acceptable
Taste	4.90	.32	Highly Acceptable
Texture	4.88	.34	Highly Acceptable

Table 3.4 shows the level of acceptability of macaroons with shoots from Bayog and “Latik” as ingredients and flavorings perceived by the evaluators. It reflects a “highly acceptable” level of acceptability from the respondents. It is evident that taste has the highest weighted mean of 4.90. It means that “Latik” as ingredient contributed much to make the finished product tasteful and aromatic.

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Table 4.1. Level of Acceptability of Macaroons from Kawayan Killing with Corn Syrup

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.85	.39	Highly Acceptable
Aroma	4.84	.40	Highly Acceptable
Taste	4.91	.33	Highly Acceptable
Texture	4.88	.34	Highly Acceptable

Table 4.1 reflects the level of acceptability of macaroons from “Kawayan Killing” with corn syrup as perceived by the evaluators. It reveals that the appearance, aroma, taste, and texture were all assessed by the respondents as “highly acceptable” indicating their respective weighted means of 4.85, 4.84, 4.91 and 4.88 having taste as the highest. This means that the developed food product is very palatable to the respondent’s tongue.

Table 4.2. Level of Acceptability of Macaroons from Kawayan Killing with Corn Kernel

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.87	.35	Highly Acceptable
Aroma	4.90	.31	Highly Acceptable
Taste	4.91	.30	Highly Acceptable
Texture	4.86	.36	Highly Acceptable

The table exhibits the level of acceptability of macaroons made from “Kawayan Killing” with Corn kernel. As presented in Table 4.2, the appearance, aroma, taste and texture of macaroon made from kawayan killing flavored with corn kernel were “highly” acceptable to the respondents as indicated by their respective mean values of 4.87, 4.90, 4.91, and 4.86. It clearly implies that the product is delicious.

Table 4.3. Level of Acceptability of Macaroons from Kawayan Killing with Honey.

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.90	.31	Highly Acceptable
Aroma	4.88	.37	Highly Acceptable
Taste	4.88	.34	Highly Acceptable
Texture	4.85	.38	Highly Acceptable

The respondents gave a “highly acceptable” evaluation to the appearance, aroma, taste, and texture of macaroon made from kawayan killing flavored with honey as indicated by their mean values of 4.90, 4.88, 4.88, and 4.85. It is evident that the food product is pleasing to the eyes of the respondents.

Table 4.4. Level of Acceptability of Macaroons from Kawayan Killing with Latik

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.87	.35	Highly Acceptable
Aroma	4.90	.31	Highly Acceptable
Taste	4.93	.25	Highly Acceptable
Texture	4.88	.34	Highly Acceptable

The table above shows the level of acceptability of macaroons from “Kawayan killing” with Latik. It reflects a “highly acceptable” level of acceptability from the respondents in terms of appearance, aroma, taste, and texture. It is evident that the taste of the macaroon has the highest weighted mean of 4.93. It means that “Latik” as ingredient contributed much to make the finished food product yummy.

Table 5.1. Level of Acceptability of Macaroons from Kawayan Tinik with Corn Syrup

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.89	.36	Highly Acceptable
Aroma	4.89	.33	Highly Acceptable
Taste	4.87	.37	Highly Acceptable
Texture	4.84	.44	Highly Acceptable

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The table above shows the acceptability of macaroons from “Kawayan Tinik” with Corn syrup. The respondents gave a rating of “highly acceptable” in the appearance, aroma, taste and texture of macaroon from kawayan tinik with corn syrup as indicated by their respective weighted means of 4.89, 4.89, 4.87, and 4.84. It means that the developed food product is pleasant and agreeable to their sense of taste.

Table 5.2. Level of Acceptability of Macaroons from Kawayan Tinik with Corn Kernel

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.88	.34	Highly Acceptable
Aroma	4.87	.33	Highly Acceptable
Taste	4.89	.33	Highly Acceptable
Texture	4.84	.42	Highly Acceptable

The table 5.2 exhibits the level of acceptability of macaroons from “Kawayan Tinik” with Corn kernel. It reflects a “highly acceptable” evaluation from the respondents with corresponding means of 4.88, 4.87, 4.89, and 4.84. It clearly implies that the developed macaroon is palatable.

Table 5.3. Level of Acceptability of Macaroons from Kawayan Tinik with Honey

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.89	.33	Highly Acceptable
Aroma	4.90	.32	Highly Acceptable
Taste	4.90	.36	Highly Acceptable
Texture	4.90	.32	Highly Acceptable

The table above shows the acceptability of macaroons from “Kawayan Tinik” with honey. It reflects that the evaluators gave a “highly acceptable” rating as to the appearance, aroma, taste, and texture of the macaroons with corresponding means of 4.89, 4.90, 4.90, and 4.90. It means that developed product has good aroma, delicious and soft.

Table 5.4. Level of Acceptability of Macaroons from Kawayan Tinik with Latik

	Mean	Std. Deviation	Level of Acceptability
Appearance	4.91	.27	Highly Acceptable
Aroma	4.90	.35	Highly Acceptable
Taste	4.92	.32	Highly Acceptable
Texture	4.90	.32	Highly Acceptable

The table reveals the level of acceptability of macaroons from “kawayan Tinik” with Latik. The data revealed that the appearance, aroma, taste, and texture of macaroons from kawayan tinik with latik were highly acceptable by the respondents as indicated by the means of 4.91, 4.90, 4.92 and 4.90. It clearly implies that the developed macaroon is very nutritious and palatable.

Table 6.1. Sensorial Evaluation of Macaroons from Bayog with Corn Syrup

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.95	.11	Highly Acceptable
Teenagers	4.88	.29	Highly Acceptable
Adults	4.88	.26	Highly Acceptable
Experts	4.68	.49	Highly Acceptable
Mean	4.85	.33	Highly Acceptable

The table above displays the respondents’ sensorial evaluation of the macaroons made from bayog with corn syrup in terms of their age groups. It shows that all age groups gave highly acceptable evaluation: children (M: 4.95, SD: .11), teenagers (M: 4.88, SD: .29), adults (M: 4.88, SD: .26), and experts (M: 4.68, SD: .49). The overall sensorial evaluation is highly acceptable with a grand mean of 4.85 and standard deviation of .33. It implies that the four groups of respondents gave the same rating to the developed macaroons. It means that the evaluators liked the macaroons very much.

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Table 6.2. Sensorial Evaluation of Macaroons from Bayog with Corn Kernel

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.96	.12	Highly Acceptable
Teenagers	4.92	.24	Highly Acceptable
Adults	4.89	.27	Highly Acceptable
Experts	4.75	.42	Highly Acceptable
Mean	4.88	.29	Highly Acceptable

The table above displays the respondents' sensorial evaluation of the macaroons from bayog with corn kernel in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.96, SD: .12), teenagers (M: 4.92, SD: .24), adults (M: 4.89, SD: .27), and experts (M: 4.75, SD: .42). The overall sensorial evaluation is highly acceptable with a grand mean of 4.88 and standard deviation of .29.

Table 6.3. Sensorial Evaluation of Macaroons from Bayog with Honey

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.94	.15	Highly Acceptable
Teenagers	4.91	.22	Highly Acceptable
Adults	4.88	.28	Highly Acceptable
Experts	4.61	.60	Highly Acceptable
Mean	4.83	.37	Highly Acceptable

The table displays the respondents' sensorial evaluation of the macaroons from bayog with honey in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.94, SD: .15), teenagers (M: 4.91, SD: .22), adults (M: 4.88, SD: .28), and experts (M: 4.61, SD: .60). The overall sensorial evaluation is highly acceptable with a grand mean of 4.83 and standard deviation of .37.

Table 6.4. Sensorial Evaluation of Macaroons from Bayog with Latik

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.94	.19	Highly Acceptable
Teenagers	4.93	.17	Highly Acceptable
Adults	4.30	.25	Highly Acceptable
Experts	4.76	.42	Highly Acceptable
Mean	4.88	.28	Highly Acceptable

Table 6.4 reveals the respondents' sensorial evaluation of the macaroons from bayog with latik in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.94, SD: .19), teenagers (M: 4.93, SD: .17), adults (M: 4.30, SD: .25), and experts (M: 4.76, SD: .42). The overall sensorial evaluation is highly acceptable with a grand mean of 4.88 and standard deviation of .28.

Table 7.1. Sensorial Evaluation of macaroons from Kawayan Killing with Corn Syrup

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.95	.13	Highly Acceptable
Teenagers	4.90	.23	Highly Acceptable
Adults	4.91	.21	Highly Acceptable
Experts	4.71	.52	Highly Acceptable
Mean	4.87	.32	Highly Acceptable

The table above displays the respondents' sensorial evaluation of the macaroons from kawayan killing with corn syrup in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.95, SD: .13), teenagers (M: 4.90,

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SD: .23), adults (M: 4.91, SD: .21), and experts (M: 4.71, SD: .52). The overall sensorial evaluation is highly acceptable with a grand mean of 4.87 and standard deviation of .32.

Table 7.2. Sensorial Evaluation of macaroons from Kawayan Killing with Corn Kernel

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.94	.14	Highly Acceptable
Teenagers	4.95	.20	Highly Acceptable
Adults	4.87	.27	Highly Acceptable
Experts	4.80	.41	Highly Acceptable
Mean	4.89	.28	Highly Acceptable

The table above displays the respondents' sensorial evaluation of the macaroons from kawayan killing with corn kernel in terms of their age groups. The result revealed that all age groups have highly acceptable evaluation: children (M: 4.94, SD: .14), teenagers (M: 4.95, SD: .20), adults (M: 4.87, SD: .27), and experts (M: 4.80, SD: .41). The overall sensorial evaluation is highly acceptable with a grand mean of 4.89 and standard deviation of .28.

Table 7.3. Sensorial Evaluation of Macaroons from Kawayan Killing with Honey

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.92	.19	Highly Acceptable
Teenagers	4.94	.20	Highly Acceptable
Adults	4.90	.25	Highly Acceptable
Experts	4.75	.47	Highly Acceptable
Mean	4.88	.31	Highly Acceptable

The table above displays the respondents' sensorial evaluation of the macaroons from kawayan killing with honey in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.92, SD: .19), teenagers (M: 4.94, SD: .20), adults (M: 4.90, SD: .25), and experts (M: 4.75, SD: .47). The overall sensorial evaluation is highly acceptable with a grand mean of 4.88 and standard deviation of .31.

Table 7.4. Sensorial Evaluation of Macaroons from Kawayan Killing with Latik.

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.98	.09	Highly Acceptable
Teenagers	4.93	.28	Highly Acceptable
Adults	4.90	.23	Highly Acceptable
Experts	4.77	.37	Highly Acceptable
Mean	4.90	.27	Highly Acceptable

Table 7.4 displays the respondents' sensorial evaluation of the macaroons from kawayan killing with latik in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.98, SD: .09), teenagers (M: 4.93, SD: .28), adults (M: 4.90, SD: .23), and experts (M: 4.77, SD: .37). The overall sensorial evaluation is highly acceptable with a grand mean of 4.90 and standard deviation of .27.

Table 8.1. Sensorial Evaluation of Macaroons from Kawayan Tinik with Corn Syrup

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.95	.13	Highly Acceptable
Teenagers	4.93	.20	Highly Acceptable
Adults	4.93	.19	Highly Acceptable
Experts	4.67	.55	Highly Acceptable
Mean	4.87	.33	Highly Acceptable

Table 8.1 shows the respondents' sensorial evaluation of the macaroons from kawayan tinik with corn syrup in terms of their age groups. As shown, all age groups have highly acceptable evaluation: children (M: 4.95, SD: .13), teenagers (M: 4.93, SD: .20), adults

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(M: 4.93, SD: .19), and experts (M: 4.67, SD: .55). The overall sensorial evaluation is highly acceptable with a grand mean of 4.87 and standard deviation of .33.

Table 8.2. Sensorial Evaluation of macaroons from Kawayan Tinik with Corn Kernel

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.92	.22	Highly Acceptable
Teenagers	4.94	.20	Highly Acceptable
Adults	4.85	.28	Highly Acceptable
Experts	4.76	.46	Highly Acceptable
Mean	4.87	.31	Highly Acceptable

The table above displays the respondents' sensorial evaluation of the macaroons from kawayan tinik with corn kernel in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.92, SD: .22), teenagers (M: 4.94, SD: .20), adults (M: 4.85, SD: .28), and experts (M: 4.76, SD: .46). The overall sensorial evaluation is highly acceptable with a grand mean of 4.87 and standard deviation of .31.

Table 8.3. Sensorial Evaluation of macaroons from Kawayan Tinik with Honey

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.96	.14	Highly Acceptable
Teenagers	4.97	.13	Highly Acceptable
Adults	4.90	.25	Highly Acceptable
Experts	4.80	.46	Highly Acceptable
Mean	4.91	.28	Highly Acceptable

The table above displays the respondents' sensorial evaluation of the macaroons from kawayan tinik with honey in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.96, SD: .10), teenagers (M: 4.96, SD: .18), adults (M: 4.90, SD: .23), and experts (M: 4.75, SD: .52). The overall sensorial evaluation is highly acceptable with a grand mean of 4.90 and standard deviation of .31.

Table 8.4. Sensorial Evaluation of Macaroons from Kawayan Tinik with Latik

Age Group	Mean	Std. Deviation	Descriptive Rating
Children	4.96	.10	Highly Acceptable
Teenagers	4.96	.18	Highly Acceptable
Adults	4.90	.23	Highly Acceptable
Experts	4.75	.52	Highly Acceptable
Mean	4.90	.31	Highly Acceptable

The table displays the respondents' sensorial evaluation of the macaroons from kawayan tinik with latik in terms of their age groups. It shows that all age groups have highly acceptable evaluation: children (M: 4.96, SD: .14), teenagers (M: 4.97, SD: .13), adults (M: 4.90, SD: .25), and experts (M: 4.80, SD: .46). The overall sensorial evaluation is highly acceptable with a grand mean of 4.91 and standard deviation of .28.

Difference in the Level of General Acceptability of the Macaroons Across Age Groups

Table 9.1. ANOVA of Bayog with Corn Syrup

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.252	3	.417	4.098	.008
Within Groups	11.810	116	.102		
Total	13.062	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from bayog with corn syrup across the four age groups. It was revealed that a significant difference exists at .05 level of significance. Hence, a post hoc analysis using tukey HSD was conducted to determine which age groups have different

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level of acceptability towards the macaroons. As shown in the table 9.1.1 the significant difference exists between the children and experts. This implies that possible reasons why macaroon is more acceptable to the children than to the experts.

Table 9.1.1. Multiple Comparisons (Using Tukey HSD) of Bayog with Corn Syrup

(I) Age Group	(J) Age Group	Mean Difference (I-J)	Sig.	Descriptive Rating
Children	Teenagers	.07500	.799	NS
	Adults	.07500	.799	NS
	Experts	.27500*	.006	*
Teenagers	Children	-.07500	.799	NS
	Adults	.00000	1.000	NS
	Experts	.20000	.078	NS
Adults	Children	-.07500	.799	NS
	Teenagers	.00000	1.000	NS
	Experts	.20000	.078	NS
Experts	Children	-.27500*	.006	*
	Teenagers	-.20000	.078	NS
	Adults	-.20000	.078	NS
*. The mean difference is significant at the 0.05 level.				

Table 9.2. ANOVA of Bayog with Corn Kernel

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.731	3	.244	2.934	.036
Within Groups	9.631	116	.083		
Total	10.362	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from bayog with corn kernel across the four age groups. It was revealed that a significant difference exists at .05 level of significance. Hence, a post hoc analysis using tukey HSD was conducted to determine which age groups have different level of acceptability towards the macaroons. As shown in the table 9.2.1 the significant difference exists between the children and experts. This means that this type of macaroon is more acceptable to the children than to the experts

Table 9.2.1. Multiple Comparisons (Using Tukey HSD) of Bayog with Corn Kernel

(I) Age Group	(J) Age Group	Mean Difference (I-J)	Sig.	Descriptive Rating
Children	Teenagers	.04167	.944	NS
	Adults	.07500	.745	NS
	Experts	.20833*	.030	*
Teenagers	Children	-.04167	.944	NS
	Adults	.03333	.970	NS
	Experts	.16667	.119	NS
Adults	Children	-.07500	.745	NS
	Teenagers	-.03333	.970	NS
	Experts	.13333	.282	NS
Experts	Children	-.20833*	.030	*
	Teenagers	-.16667	.119	NS
	Adults	-.13333	.282	NS
*. The mean difference is significant at the 0.05 level	*. The mean difference is significant at the 0.05 level.			

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Table 9.3. ANOVA of Bayog with Honey

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2.039	3	.680	5.279	.002
Within Groups	14.935	116	.129		
Total	16.974	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from bayog with corn kernel across the four age groups. It was revealed that a significant difference exists at .05 level of significance. Hence, a post hoc analysis using tukey HSD was conducted to determine which age groups have different level of acceptability towards the macaroons. As shown in the table 9.3.1 the significant difference exists between the (1) children and experts, (2) teenagers and experts, and (3) adults and experts. This means that this type of macaroon is more acceptable to the children, teenagers, and adults than to the experts.

Table 9.3.1. Multiple Comparisons (Using Tukey HSD) of Bayog with Honey

(I) Age Group	(J) Age Group	Mean Difference (I-J)	Sig.	Descriptive Rating
Children	Teenagers	.02500	.993	NS
	Adults	.05833	.922	NS
	Experts	.32500*	.004	*
Teenagers	Children	-.02500	.993	NS
	Adults	.03333	.984	NS
	Experts	.30000*	.008	*
Adults	Children	-.05833	.922	NS
	Teenagers	-.03333	.984	NS
	Experts	.26667*	.024	*
Experts	Children	-.32500*	.004	*
	Teenagers	-.30000*	.008	*
	Adults	-.26667*	.024	*
*, The mean difference is significant at the 0.05 level.				

Table 9.4. ANOVA of Bayog with Latik

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.593	3	.198	2.509	.062
Within Groups	9.144	116	.079		
Total	9.737	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from bayog with honey across the four age groups. There is no significant difference between their level of acceptability at .05 level of significance. This means that this type of macaroon has a similar acceptability across the respondents' age groups.

Table 10.1. ANOVA of Kawayan Killing with Corn Syrup

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.046	3	.349	3.530	.017
Within Groups	11.454	116	.099		
Total	12.500	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from kawayan killing with corn syrup across the four age groups. It was revealed that a significant difference exists at .05 level of significance. Hence, a post hoc analysis using tukey HSD was conducted to determine which age groups have

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different level of acceptability towards the macaroons. As shown in the table 10.1.1 the significant difference exists between the children and experts. This means that this type of macaroon is more acceptable to the children than to the experts.

Table 10.1.1. Multiple Comparisons (Using Tukey HSD) of *Kawayan Killing* with Corn Syrup

(I) AgeGroup	(J) AgeGroup	Mean Difference (I-J)	Sig.	Descriptive Rating
Children	Teenagers	.05000	.886	NS
	Adults	.04167	.956	NS
	Experts	.24167*	.018	*
Teenagers	Children	-.05000	.927	NS
	Adults	-.00833	1.000	NS
	Experts	.19167	.090	NS
Adults	Children	-.04167	.956	NS
	Teenagers	.00833	1.000	NS
	Experts	.20000	.071	NS
Experts	Children	-.24167*	.018	*
	Teenagers	-.19167	.090	NS
	Adults	-.20000	.071	NS
	*. The mean difference is significant at the 0.05 level.			

Table 10.2. ANOVA of *Kawayan Killing* with Corn Kernel

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.438	3	.146	1.900	.133
Within Groups	8.904	116	.077		
Total	9.342	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from *kawayan killing* with corn kernel across the four age groups. There is no significant difference between their level of acceptability at .05 level of significance. This means that this type of macaroon has a similar acceptability across the respondents' age groups.

Table 10.3. ANOVA of *Kawayan Killing* with Honey

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.631	3	.210	2.245	.087
Within Groups	10.865	116	.094		
Total	11.495	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from *kawayan killing* with honey across the four age groups. There is no significant difference between their level of acceptability at .05 level of significance. This means that this type of macaroon has a similar acceptability across the respondents' age groups.

Table 10.4. ANOVA of *Kawayan Killing* with Latik

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.712	3	.237	3.355	.021
Within Groups	8.213	116	.071		
Total	8.925	119			

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A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from kawayan killing with latik across the four age groups. It was revealed that a significant difference exists at .05 level of significance. Hence, a post hoc analysis using tukey HSD was conducted to determine which age groups have different level of acceptability towards the macaroons. As shown in the table 10.4.1 the significant difference exists between the children and experts. This means that this type of macaroon is more acceptable to the children than to the experts.

Table 10.1.1. Multiple Comparisons (Using Tukey HSD) of *Kawayan Killing with Latik*

(I) AgeGroup	(J) AgeGroup	Mean Difference (I-J)	Sig.	Descriptive Rating
Children	Teenagers	.05000	.886	NS
	Adults	.07500	.695	NS
	Experts	.20833*	.016	*
Teenagers	Children	-.05000	.886	NS
	Adults	.02500	.983	NS
	Experts	.15833	.103	NS
Adults	Children	-.07500	.695	NS
	Teenagers	-.02500	.983	NS
	Experts	.13333	.217	NS
Experts	Children	-.20833*	.016	*
	Teenagers	-.15833	.103	NS
	Adults	-.13333	.217	NS

*. The mean difference is significant at the 0.05 level.

Table 11.1. ANOVA of *Kawayan Tinik with Corn Syrup*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.613	3	.538	5.245	.002
Within Groups	11.888	116	.102		
Total	13.500	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from kawayan tinik with corn syrup across the four age groups. It was revealed that a significant difference exists at .05 level of significance. Hence, a post hoc analysis using tukey HSD was conducted to determine which age groups have different level of acceptability towards the macaroons. As shown in the table 11.1.1 on the next page, the significant difference exists between the children and experts. This means that this type of macaroon is more acceptable to the children than to the experts.

Table 11.1.1. Multiple Comparisons (Using Tukey HSD) of *Kawayan Tinik with Corn Syrup*

(I) AgeGroup	(J) AgeGroup	Mean Difference (I-J)	Sig.	Descriptive Rating
Children	Teenagers	.02500	.990	NS
	Adults	.02500	.990	NS
	Experts	.28333*	.005	*
Teenagers	Children	-.02500	.990	NS
	Adults	.00000	1.000	NS
	Experts	.25833*	.012	*
Adults	Children	-.02500	.990	NS
	Teenagers	.00000	1.000	NS
	Experts	.25833*	.012	*
Experts	Children	-.28333*	.005	*
	Teenagers	-.25833*	.012	*
	Adults			

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	. The mean difference is significant at the 0.05 level.	-.25833	.012	*

Table 11.2. ANOVA of *Kawayan Tinik* with Corn Kernel

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.568	3	.189	1.943	.126
Within Groups	11.306	116	.097		
Total	11.874	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from *kawayan tinik* with corn kernel across the four age groups. There is no significant difference between their level of acceptability at .05 level of significance. This means that this type of macaroon has a similar acceptability across the respondents' age groups.

Table 11.3. ANOVA of *Kawayan Tinik* with Honey

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.871	3	.290	3.117	.029
Within Groups	10.804	116	.093		
Total	11.675	119			

A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from *kawayan tinik* with honey across the four age groups. It was revealed that a significant difference exists at .05 level of significance. Hence, a post hoc analysis using tukey HSD was conducted to determine which age groups have different level of acceptability towards the macaroons. As shown in the table below, the significant difference exists between the (1) children and experts, and (2) teenagers and experts. This means that this type of macaroon is more acceptable to the children and teenagers than to the experts.

Table 11.3.1. Multiple Comparisons (Using Tukey HSD) of *Kawayan Tinik* with Honey

(I) AgeGroup	(J) AgeGroup	Mean Difference (I-J)	Sig.	Descriptive Rating
Children	Teenagers	.00000	1.000	NS
	Adults	.05833	.881	NS
	Experts	.20833*	.045	*
Teenagers	Children	.00000	1.000	NS
	Adults	.05833	.881	NS
	Experts	.20833*	.045	*
Adults	Children	-.05833	.881	NS
	Teenagers	-.05833	.881	NS
	Experts	.15000	.232	NS
Experts	Children	-.20833*	.045	*
	Teenagers	-.20833*	.045	*
	Adults	-.15000	.232	NS
*. The mean difference is significant at the 0.05 level.				

Table 11.4. ANOVA of *Kawayan Tinik* with Latik

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.589	3	.196	2.427	.069
Within Groups	9.385	116	.081		
Total	9.974	119			

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A One-way Between Groups Analysis of Variance was conducted to investigate the differences in the level of general acceptability of the macaroons from kawayan tinik with latik across the four age groups. There is no significant difference between their level of acceptability at .05 level of significance. This means that this type of macaroon has a similar acceptability across the respondents' age groups.

C. Nutritive Content of Bamboo Shoot Macaroons

Report analysis of DOST on Nutritive Content of Bamboo Shoot Macaroons

Number	Sample Description	Parameter	Result	Method Used	Date of Analysis	Analyst
CHM-S-479	Bamboo Shoots (Bayog Macaroons) Honey	Moisture (g/100g)	24.41	Gravimetric	July 27, 2016	CTM
		Ash (g/100g)	1.64	Gravimetric	August 3, 2016	CTM
		Crude Protein (g/100g)	5.90	Block Digest/Steam Distillation	August 15, 2016	EMML
		Total Fat (g/100g)	9.23	Soxhlet Extraction	August 10, 2016	CTM
		Carbohydrates (g/100g)	58.82	by Computation	-	CTM
CHM-S-480	Bamboo Shoots (Bayog Macaroons) Latik	Moisture (g/100g)	25.18	Gravimetric	July 27, 2016	CTM
		Ash (g/100g)	1.92	Gravimetric	August 3, 2016	CTM
		Crude Protein (g/100g)	5.91	Block Digest/Steam Distillation	August 15, 2016	EMML
		Total Fat (g/100g)	11.42	Soxhlet Extraction	August 10, 2016	CTM
		Carbohydrates (g/100g)	55.57	by Computation	-	CTM

Table showing the Nutritive Content of developed Bamboo Shoot Macaroons compared to available macaroons in the Market.

	Calories	Moisture	Ash	Crude Protein	Total Percent Fat	Total Percent Carbohydrates
Bamboo Shoots Macaroons Flavored with Honey	N/A	24.41g/100g	1.64 g/100g	5.90g/100g	9.23g/100g	58.82g/100g
*Macaroon A	46.66g/100g	N/A	N/A	1g	150g/100g	33.33g/100g
*Macaroon B	52.63g/100g	N/A	N/A	1g	154.54g/100g	31.57g/100g
Bamboo Shoots Macaroons Flavored with Latik	N/A	25.18g/100g	1.92g/100g	5.91g/100g	11.42g/100g	55.57g/100g

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*Macaroon A	46.66g/100g	N/A	N/A	1g	150g/100g	33.33g/100g
*Macaroon B	52.63g/100g	N/A	N/A	1g	154.54g/100g	31.57g/100g
*Macaroons Sold in the Market						

Table shows Report of Analysis of Department of Science and Technology (DOST) on Bamboo shoot macaroons flavored with Honey, and Bamboo shoot macaroons flavored with Latik regarding its nutritional value. The data revealed that the protein content of the bamboo shoot macaroons flavored with Honey and Latik has a high protein value of 5.90 and 5.91 as compared to macaroon A and macaroon B available in the market with 1g of protein content. The total percent fat of Bamboo shoot macaroons flavored with honey and Latik of 9.23 and 11.42 respectively is very low as compared to macaroon A and macaroon B of 150g and 154.54g there is a significant difference on its total percent fat content. As to its total percent of carbohydrates of bamboo shoot macaroons flavored with Honey and bamboo shoot macaroons flavored with Latik of 58.82 and 55.57 is greater than 33.33 and 31.57. Thus, the obtain difference is significant.

The proximate analysis of the nutritive content of the developed Bamboo Shoot Macaroons in terms of moisture content, ash content, protein content, fat content and carbohydrate content is highly recommended for the developed products as compared with the other macaroon product available in the market. Hence, bamboo shoots have high nutritive value. It is healthy and friendly food which helps control bad cholesterol throughout the body. Moreover, it is a good source of energy giving and body building food which plays an important role in maintaining normal blood pressure and heart rate.

CONCLUSIONS

Based on the findings of this study, it can be concluded that all twelve types of macaroons using three varieties of bamboo shoots and four different flavorings were highly accepted in terms of appearance, aroma, taste, and texture. The general acceptability of all twelve types of macaroons is high in terms of the respondents' age group where the best product is macaroon from Kawayan Tinik with Latik. This said general acceptability differs significantly exists between children and experts for macaroons from Bayog with Corn Syrup, Bayog with Corn Kernel, Bayog with Honey, Kawayan Killing with Corn Syrup, Kawayan Killing with Latik, and Kawayan Tinik with Corn Syrup, while between the children, teenagers, and experts for Kawayan Tinik flavored with Honey Macaroons.

The Proximate Analysis of the Nutritive Content of the developed Bamboo shoot macaroons in terms of moisture content, ash content, protein content, fat content, and carbohydrate content is highly recommended for the developed product as compared with the other macaroon product available and sold in the market.

Finally, the shelf-life of bamboo shoot macaroons stored at room temperature can last for six days and bamboo shoot macaroons stored at cold temperature can last for ten days.

RECOMMENDATIONS

In the light of the foregoing findings and conclusions, the research recommends the following:

1. Homemakers, professionals, students, or anyone interested is encouraged to make flavored macaroons using bamboo shoot as main ingredient as the ones used in this study
2. Care and accuracy are to be observed when making flavored macaroons to ensure high quality products.
3. Food technology teachers, students, homemakers are encouraged to do more research and innovations in the making of quality food products particularly considering nutritional value and availability of local materials.
4. More baked products should be made to determine the acceptability of bamboo shoots as main ingredient.
5. Findings of the study may be made known to the school administrator particularly the office of the Research and Extension. Furthermore, these findings would in some ways help Technical Teacher Educators to extend income generating enterprise in the campus as well as in the University.
6. Farmers may consider growing different varieties of bamboo not just for their personal consumption but also for additional income of the family.
7. Research of this kind should be conducted to enrich the findings of this study.

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REFERENCES

A. Books

- 1) De Guzman, Ines A. (2004). Technology and livelihood education I. Innovative Educational Materials, Inc.
- 2) Manantan, Victoria T. (1995). Food Management and Service. Quezon City: Phoenix Publishing House Inc.
- 3) Claudio, V.S, and Ruiz, A.J. (2007) International Cuisine. Philippine Copyright, 2007 by National Book Store, Inc.

B. Internet Materials

- 1) XU Sheng-You 1, 2, CAO WAN-YOU1, SONG Yue-qin1, FANG Le-jin1 (2005),
- 2) "Analysis and Evaluation of Protein and Amino Acid Nutritional Components of Different Species of Bamboo Shoots". (1. Department of resource and environment, Huang Shan College, Huang Shan 245000, China. 2. Department of Environment and Engineering. Zhejiang University, Hang Zhou 310029, China) <http://www.spkx.net.cn/EN/>
- 3) Nirmala C; Sharma, M,L,j E, David(2008) A Comparative Study of Nutrient and Canned Bamboo Shoots of Denehocalamaus Gigantes Munro (Bamboo Science and Culture. 2008 vol. 21 issue 1. P.41-47 p)
- 4) Maroma, Dolly P. (2015) Utilization of Bamboo Shoots (Bambusa Vulgaris) in Chips Production
- 5) Michael Tong Shun Lee Palace, New York, NY, Epicurious/January 2001. Spinach with Bamboo Shoots. <http://www.epicurious.com/recipes/Foodviews/Spinach-with-Bamboo-shoots104616>
- 6) AG, 2013 Asian Bamboo. The Nutritional Benefits of Eating Bamboo Shoots. http://www.Asianbamboo.com/Bambooculture/bamboo-the-species/the_nutritional_benefits-of-eating_bamboo-shoots/

C. Published and Unpublished Materials

- 1) Matibag, Ilona A. (2014) Acceptability of macaroons made of varying levels of Bamboo Shoots, unpublished masteral thesis, Isabela State University, Echague Campus Isabela.
- 2) Domingo, Jane M. (2010) Potential and Profitability of Banana Blossom in different proportions are Extender to Fried Lumpia, unpublished masteral thesis, Isabela State University, City of Ilagan.
- 3) Bautista, Ivy D. (2015) Acceptability of Dried Mango, Pineapple, Banana, and Sour soup as flavouring ingredients to dessert cookies (polvoron).
- 4) Somera, Mariel L. (2016) Development and Acceptability of Corn Flour as main ingredient in baked products, unpublished masteral thesis, Isabela State University, City of Ilagan.
- 5) Alejandro, Glorilyn B. (2015). Development and acceptability of rice fields eel (monopterus Albus) Food products unpublished material thesis, Isabela State University, City of Ilagan.
- 6) Somera, Mariel L. (2016).Development and acceptability of corn flour as main Ingredient
- 7) in baked products, unpublished masteral thesis, Isabela State University, City of Ilagan.



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