

Development, Quality Characteristics and Consumer Testing of Pie Utilizing Pili Pulp (*Canarium Ovatum*), Saba Banana (*Musa Balbisiana*) and Young Coconut Meat (*Cocos Nucifera L*)

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Abstract:- Some of the abundant and gaining wide acceptance sources of livelihood in Sorsogon are pili (*Canarium ovatum*), banana (*Musa balbisiana*), young coconut meat (*Cocos nucifera L*), and karagomoi (*Pandanus Simplex*). This study cited a product development by making pie filling with the use of pili pulp, banana, young coconut and karagomoi as the packaging material, as well as give encouragement to the community particularly of San Ramon Bacon and Bulabog Sorsogon city who has the massive production of these products. On the other hand, Consumer testing used the 9 point hedonic scale in collecting data leading to come up with the most acceptable product. There were 225 respondents involving students, residents of San Ramon Bacon and Bulabog, Sorsogon city. Results revealed that the third treatment was the most acceptable product which is like very much (8.5). Moreover, the initial physico-chemical analysis of pie revealed 5.35 pH, 17° Brix total soluble solids, and 24.40% moisture content. The initial shelf life result of pie in normal temperature is up to 3 days and if kept refrigerated it will last up to 2 weeks. The product nutrition information shows that the pie is nutritious having a total of 874 calories, total fat 54%, saturated fat 0%, cholesterol 19.40%, sodium 9.35%, carbohydrate of 44.67%, Dietary Fiber 56.80%, sugars 73.14 grams, Protein 39.20%, vitamin a 22%, vitamin c 82%, calcium 60%, iron 11%, vitamin b-6 27%, vitamin b-12 5%, and magnesium 19%. In view of this, recommendations are made for the improvement of the product.

Keywords:- Utilization, Acceptability, Consumer testing, Quality characteristics, Nutrition information.

I.INTRODUCTION

Natural resources are scattered throughout the Philippines. They have a lot of promising impact into the sustainability of food adequacy. One of which is a healthy agricultural land that brings good harvest of several agricultural products. To specify, Bicol region is well known with varieties of indigenous products such as banana, sweet potato, cassava, pili, coconut, and even indigenous sources for handicrafts as well as for food packaging material. In view of these numerous kinds of food products are developed in country including pie using different raw materials that gave huge acceptance to the community. Pies on the other hand are considered to be the specialty of several provinces in the Philippines as well as to other countries. Developing

pie concerning on three abundant and nutritious products such as pili pulp, banana, and young coconut meat is a tremendous step in developing a Sorsogon based pie since it also uses an authentic native packaging which is karagomoi, a product that is well known in Sorsogon province that is used in different handicrafts and now used as a food packaging material.

For many years several studies and products are developed in line with these three highly recognized raw materials, almost all parts has its use, but combining this three in one product is very rare. This study sought to develop pie filling with the combination of pili pulp (*Canarium ovatum*), banana (*Musa balbisiana*) and young coconut meat (*Cocos nucifera L*). In connection to this, livelihood is labeled to be one of the keys in sustaining people's daily living, likewise, several government and private sectors cited their eagerness to focus and work on this very important aspect. This developed product is one way to enlighten the communities mind in line with livelihood and its future effect to their locality once given sufficient effort. This will also lead to increase communities appropriate consumption with regards to their crops since the above mentioned raw materials are abundant in the province particularly in the community of San Ramon Bacon Sorsogon and Bulabog Sorsogon, they will no longer primarily dispatch their crops after harvesting but they would rather try to create other products out of their rich resources.

In like manner, the Asian Vegetable Research and Development Center (2003) aims to reduce poverty in developing countries through improved production and consumption of indigenous crops. As cited, one of the focused projects by AVRDC is the promotion of indigenous crops for poverty alleviation and nutrition improvement of rural households in the Philippines. It is very clear that poverty is one big issue in the country for a very long time; therefore livelihood opportunities coming from these indigenous raw materials are really needed in crafting solutions for this problem. In view of these, dela Cruz (2002) strengthens that utilizing the indigenous materials present in the country will be one of the remedies for these long term problem.

Likewise, the sub-committee on Fruits and vegetables of the National agriculture and Fishery council (NAFC, 2003) also considers Indigenous materials as a help in addressing food security and livelihood by substituting for/or complementing the more expensive and conventional sources of food. They also added that these indigenous products add to job generation among Filipino farmers and will likewise ensure food security and will therefore reduce poverty. The failure to develop the agricultural sector is one considered cause of poverty in the country (Asian Bank, 2009).

Similarly, Imperial of the Department of Agriculture region V states that Pili is an indigenous product, and they easily grow and give huge benefits to the community. Their pulp is considered a tree of hope; a premium crop; “The Majestic Tree”; Indigenous crop and “Flagship Commodity of the Bicol Region in the Philippines”. It was also stated that Bicol region is the major producer of pili in the country with a share of 78% domestic production. Likewise, Mendioron et.al reiterated that Pili is considered to be the most important nut-producing species indigenous to the country. It has a nationwide acceptance and has great potential to develop into a major industry (Philippine Fruit Network 2001). Pili pulp and nuts are used in several culinary purposes such as in baked products, desserts, main dishes, pasta/noodles, sauces and many more. Pili pulp is not just a delicious local product but also bringing several health benefits. This includes vitamin A, vitamin C, calcium, iron, vitamin B-6, magnesium, protein, and natural sugar.

On the other hand banana is considered second largest produced fruit after citrus, contributing about 16% of the world’s total fruit production, it is also one of the most widely grown tropical fruits cultivated in one hundred fifty countries. In connection to this, banana serves as an ideal and low cost food source for developing countries where most of the populations rely mostly on bananas for food (Mohapatra et.al). This show the versatility and usefulness of banana in many countries for the reason that almost all its parts have its use.

Locally, banana particularly *saba* (*Musa balbisiana*) is a well-known and abundant crop of the Philippines particularly in Bicol region. Processed products coming from saba are patronized both in local and international market. The Bureau of Plant and Industry, 2010 cited that along with the indigenous materials the banana parts could be utilized even its peel; this gave enough emphasis on the usefulness of this product since even its peel could be made into a delicious patty.

Similarly, Department of Trade and Industry (2005) identified microwavable banana as a flagship project to target more overseas Filipinos, attract 500 million of investments, expand the hectares planted banana variety by another 800 hectares by 400 farmer-entrepreneurs and provide several jobs. This is one very important aspect in answering poverty by simply starting with livelihood projects that will cater the farmer themselves and give them ideas and knowledge about the versatility and richness of their locally produced products.

Saba banana is well known for several local food items such as banana cue, banana chips, banana fritter, turrón de banana, and many others. It can also be produced into banana flour for future consumption. Saba contains vitamin a, vitamin c, calcium, iron, protein, and dietary fiber.

When it comes to the coconut tree (*Cocos nucifera L*), it is termed as ‘tree of life’ or ‘divine tree’ of the Pacific Islands. It is also an important source of income, coconut is considered great reverence because of its cultural significance, economic importance and many uses. The coconut is truly a remarkable plant because it provides wood, materials for shelter and handicrafts, refreshing drinks, food, animal feed and cash from copra. It has been said that there are 121 uses of the coconut (Snowdon et.al).

Young coconut meat contains dietary fiber, protein, calcium, and natural sugar, fresh coconut meat is much lower in fat and much higher in calcium than mature coconut meat. It has less fiber and more sugar but overall it is much healthier. Fresh coconut meat is also said to have healing properties because it is high in antioxidants. Also, the fat in coconuts is medium-chain fatty acids that are better absorbed than animal saturated fat and is said to have anti-inflammatory effects. Fresh coconut meat is considered a great super food to add to a daily diet (Wolf, 2013).

In relation to food quality and safety as well as food acceptability, There are a number of Government Departments Responsible for regulating the composition and quality of foods, including the Food and Drug Administration (FDA), the United States Department of Agriculture (USDA), the National Marine Fisheries Service (NMFS) and the Environmental Protection Agency (EPA). This was designed to maintain the general quality of the food supply, to ensure the food industry provides consumers with foods that are wholesome and safe, to inform consumers about the nutritional composition of foods so that they can make knowledgeable choices about their diet, to enable fair competition amongst food companies, and to eliminate economic fraud. One of the built regulations is about sensory attributes to evaluate the quality and desirability of food products.

On the other hand, Shelf-life is the period of time over which a food maintains its safety and/or quality under reasonably foreseeable conditions of distribution, storage and use¹⁻². The shelf-life of a food begins from the time the food is produced and/or packed. Validating product shelf-life is obtaining and documenting any evidence that proves that the shelf life of a food is accurate and that the food will maintain its safety and/or quality until the end of that shelf-life (Food Safety Authority of Ireland).

To add, consumer testing can be conducted near the end of predicted shelf life to assure that Overall Liking remains at an acceptable level. The end of shelf life can be chosen based on a meaningful drop in consumer liking. This protects the brand by assuring that the product will not be perceived as lower quality when consumed close to the ‘best by’ date (Javier, National Food Lab.).

Similarly, consumer testing is common practice in the food institution. It allows companies to get feedback on a food product's quality and acceptability to consumers. This feedback helps them decide whether a product needs further development. Ultimately, if a product is not acceptable to consumers, it will not be viable. Consumer testing includes looking at physical attributes of a food, such as texture or consistency, and sensory attributes, such as flavor and aroma (Biotechnology Learning Hub).

This study primarily focuses on the utilization of locally available raw materials of Sorsogon to come up with a newly developed product out of three beneficial crops and also to extend the product to the farmers to encourage them to not limit their products utilization as well as come up with their own unique products for livelihood and other purpose.

II. OBJECTIVES

This study focuses on the development, quality characteristics and consumer test of pili pulp, banana and young coconut meat pie. Specifically, this study aims to

- Develop pie filling.
- Determine the quality characteristics of pie particularly its pH, total soluble solids, moisture content, and Shelf life.
- Determine its level of acceptability through consumer testing.
- Compute for the nutrition Information of the developed product.

III. MATERIALS AND METHODS

This research gave emphasis on the utilization of pili pulp, banana and young coconut meat in developing pie as well as the utilization of a native product particularly karagomoi as the packaging material. The procedures conducted for the development of pie was divided into five sequential parts, the production of mashed pili pulp, production of mashed banana, grated young coconut meat, production of pie crust, and the production of pie filling and lattice design.

Prior to the quality characteristics of the product, the product's pH was determined using a pH meter, its total soluble solids was identified using a refractometer and the moisture content was evaluated using a moisture analyzer. These are all conducted at the Sorsogon State College Food service Management Laboratory, Sorsogon City Campus. In connection to the consumer testing, it was conducted in three separate areas, Sorsogon State College main campus, and Barangay San Ramon Bacon and Barangay Bulabog Sorsogon city.

In line with this the most acceptable products nutritive information was computed based on the amount used every major ingredient such as pili pulp, banana, and young coconut meat; their nutritive information was computed individually per 120 grams as well as the combined nutritive information on the produced pie. Likewise, the most acceptable product also got positive response in its characteristics such as the balance representation of pili pulp, tolerable sweet taste, appetizing texture of the filling and a nice packaging material used. The evaluation was given to 225 panelists using a bicol dialect version of the nine (9) point hedonic scale from Gatchalian. They are composed of students from the SSC, residents of San Ramon Bacon and Bulabog Sorsogon City.

The research methodology used in the study was developmental, descriptive, and experimental type of research methodology. Developmental because because new pie filling was developed, descriptive for the reason that the result of the products was described based on the result of the study. It is also an experimental type of research because treatments were made to come up with the acceptability of the product.



1. Selecting good quality pili pili



2. Washing



3. Simmering



4. Submerging



5. Peeling



6. Mashing



7. Weighing

Fig. 1: Production of Mashed Pili Pulp

Figure 1 indicates the production of mashed pili pulp. Selecting good quality pili is needed. It should be free from blemishes and bruises because it produces bitter taste; it is also advisable to use pili that still have its latex on its stem because this shows that it is newly harvested. Next step is to wash the pili thoroughly to minimize microbial presence into the product; foreign materials that are also present will be

controlled. The third step is to simmer water to be used to soften pili pulp. Next is pouring or submerging pili into the simmered water and it is followed by peeling and depulping. The next step is to mash the pili pulp for even distribution once used and it is followed by weighing for the needed amount for the production of the pie.



1. Selecting Good Quality Banana



2. Washing



3. Boiling



4. Peeling



5. Mashing



6. Weighing

Fig. 2: Production of mashed banana

This figure represents the production of mashed banana. After selecting fresh banana which are free from any defects such as bruises, cuts, and blemishes, the product must be washed. Latex on the stem or stalk is a good indication that bananas are fresh and newly harvested. It is also advisable that bananas are not over ripped because it could bring an after taste into the developed product as well as it will affect

the consistency of the filling as well as its texture since one of the role of banana into the filling is to serve as a binding agent. The third process is boiling bananas until it is cooked, followed by peeling, next is mashing evenly to avoid uneven distribution once the product is used. And it is followed by the sixth step which is weighing for the needed proportion.



1. Select fresh young coconut meat



2. Washing



3. Grating



3. Weighing

Fig. 3: Production of Young Coconut Meat

In the above figure the production of grated young coconut meat was shown. The ingredient to be used must be fresh. It should be shiny in color not pale, young coconut that still has its stalk is more advisable as it indicates that is newly harvested, and the coconut shell will be safer from breakage. It is best to choose not too mature coconut as it is difficult to grate and this will lead to wastage due to the said difficulty. Young coconut that is free from cracks is also needed for the reason that it affects the taste of young coconut water and the young coconut meat this is also the reason of the rancidity of

the product. Rubbery coconut husk should also be avoided because it implicates that the young coconut is no longer fresh. These should all be avoided because it will affect the quality of the finished product. The second step is washing to lessen the microbes and foreign materials present into the raw material. Next step is grating the young coconut meat followed by weighing to get the exact amount to be used in the production of pie. An accurate and calibrated weighing scale is advisable to be used in weighing.



1. Measuring ingredients



2. Combining flour, baking powder



3. Whisk



4. Adding butter and water gradually



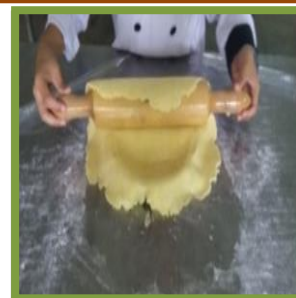
5. Cutting in



6. Dividing the dough into two equal parts



7. Flatten



8. Molding 1 part of the dough into the pie plate

Fig. 4: Production of Pie Crust

Figure 4 emphasizes the preparation of pie crust. To measure all the ingredients needed is the first thing to do. This will ensure that the ingredients needed such as all-purpose flour, baking powder, butter and water are all set. The second step is the process of combining flour, salt and baking powder. Next would be whisking to distribute the combined ingredients thoroughly. The fourth step is adding butter and

water gradually, followed by cutting in, and once well combined dividing it into two equal parts will be the next step. The next process is to flatten the dough through the use of a rolling pin. It should be evenly flattened to create a crust with even thickness at all parts. The next step is molding the rolled dough into the pie plate, followed by cutting edges following the shape of the pie plate.



1. Measuring all ingredients



2. Combining Pili Pulp, Banana and young coconut meat



3. Adding condensed and evaporated milk



4. Adding combined young coconut water & cornstarch



5. Pouring into the pie plate



6. Applying the lattice design



7. Baking



8. Packed

Fig. 5: Production of Pie Filling and Lattice

Figure 5 presents the production of pie filling and lattice design. The first step is to measure all the ingredients needed such as mashed pili pulp, mashed banana, grated buko, evaporated milk, and condensed milk. The second step is combining mashed pili pulp, mashed banana and young coconut meat. This was followed by adding evaporated and condensed milk to enhance the creaminess and sweetness of the product. The fourth step is to add the combine young coconut water and cornstarch, Next is pouring the filling into

the pie plate with molded crust, the next process is to apply the lattice design into the top of the pie. To seal the edges of the pie pricking should be applied. The next process is baking and packing for the completeness of the entire preparation.

IV. RESULTS AND DISCUSSIONS

There were three treatments conducted in the development of Pie. The production uses intervals in the amount of raw materials used including the mashed pili pulp, mashed banana, and grated young coconut meat while other ingredients are constant in measurement. In line with the first treatment it uses the lowest amount of pili pulp as compared to the other two treatments which is 25 %. While in terms of mashed banana it was considered to be the highest in measurement having an average of 30 %. When it comes to grated young coconut it was equal with the amount used in treatment three which is equivalent to 25 %, this gave an acceptability of like slightly.

The second treatment was highest in the amount of pili pulp used which is 35 % while constant in terms of banana with treatment three having 25 %, and lowest in terms of grated young coconut meat compared to the other two

treatments which is only 20 percent. This treatment got the acceptability of like moderately.

On the other hand, treatment three got the highest overall acceptability which is like very much. This treatment uses 30% of mashed pili pulp and it was the second to the highest in proportion, it was a bit lesser in the amount compared to treatment two for the reason that once the measurement is too high in pili pulp the taste of the product became fatty, as compared with treatment one which is quite lower in measurement, the taste became blunt in terms of the presence of pili pulp into the pie, this result gave the edge into the taste of the third treatment which is constant in taste. In terms of banana treatment three and two are just constant having an equivalent of 25 % each. In terms of buko treatment three is just the same in measurement with treatment one which is 25 %.

Ingredients	Treatment 1 (%)	Treatment 2 (%)	Treatment 3 (%)
Mashed Pili pulp	25	35	30
Mashed Banana	30	25	25
Grated young coconut meat	25	20	25
Condensed milk	10	10	10
Evaporated milk	5	5	5
Cornstarch	5	5	5
Yield	2 pies (8x8)	2 pies(8x8)	2 pies (8x8)

Table 1: Grams and percentage of the Three Treatments Pili, Banana, Buko Pie

Table 1 represents the grams and percentage of pili, banana and buko pie. The total weight of each treatment was 1000 grams. However, the total yield of each treatment was two 8x8 round pie. Each pie is weighing 805.2 grams. The treatments only differ in the acceptability of the product prior to the proportion of ingredients used. This table shows the proportion ingredients that vary and why treatment three got the highest level of acceptability. In connection to this, The

product emphasizes more on pili since it is one of the trademark products of Sorsogon as well as using the richness of banana as a binding agent to minimize the use of cornstarch into the product, and also without ignoring the fact that coconut is also abundant in the province, therefore, the involvement of these three major ingredients into the pie was maximized taking into consideration of combining three abundant and healthy raw materials into one end product.

Ingredients	Percentage
All-purpose flour	60
Butter	20
Water	20
Total	100

Table 2: Grams and Percentage of Pie Crust

Table 2 presents the grams and percentage of the pie crust utilized in the three treatments. The treatments used the same measurement in the preparation of crust but differ only

on the proportion of ingredients in the preparation of pie fillings. The crust uses 60 percent of all-purpose flour, butter which is 20 percent, and 20% water.

pH	5.35
Total soluble solids	17° Brix
Moisture content	24.40%

Table 3: Quality Characteristics of Pie

The above table represents the quality characteristics of pie. The total pH is 5.35; pH is the measurement of the acidity or alkalinity of a solution commonly measured on a scale of 0 to 14. It is also considered as the most common of all analytical measurements in industrial processing and since it is a direct measure of acid content. Likewise it clearly plays

an important role in food processing. Among the reasons for measuring pH in food processing include: to avoid causing health problems to consumer, and to meet the regulatory requirements. Variations of pH can impact flavor, consistency, and shelf-life (Queeney, 2007).

In connection to this the total soluble solids of the developed pie is 17° Brix. It is referring to solids that are dissolved within a substance. A common total soluble solid is sugar. Brix is a scale used to measure the amount of total soluble solids dissolved within a substance, it is used to measure sugar (Reference.com). As it increases, water activity is reduced and survival of micro-organisms becomes less likely (Science Dictionary).

When it comes to the products moisture content it contains 24.40%. Further, microbial activity of the food materials favor with the moisture availability in the food. Moisture rich foods are easily susceptible to the microbial

attack and got rotted and damaged. Thus the shelf life of the food material is determined by the moisture content in the food. Low moisture foods usually slow down growth of microorganisms hence the need for analysis and control of food moisture. Quality of the food is determined in terms of the food texture, taste, and appearance but moisture content of the food is a determination factor of the quality and the stability of the processed food products (Isengard HD, 2001). In line with this the initial shelf life result of pie shows that in normal temperature it could last up to 3 days and if kept refrigerated it will last up to 2 weeks without big changes in its properties.

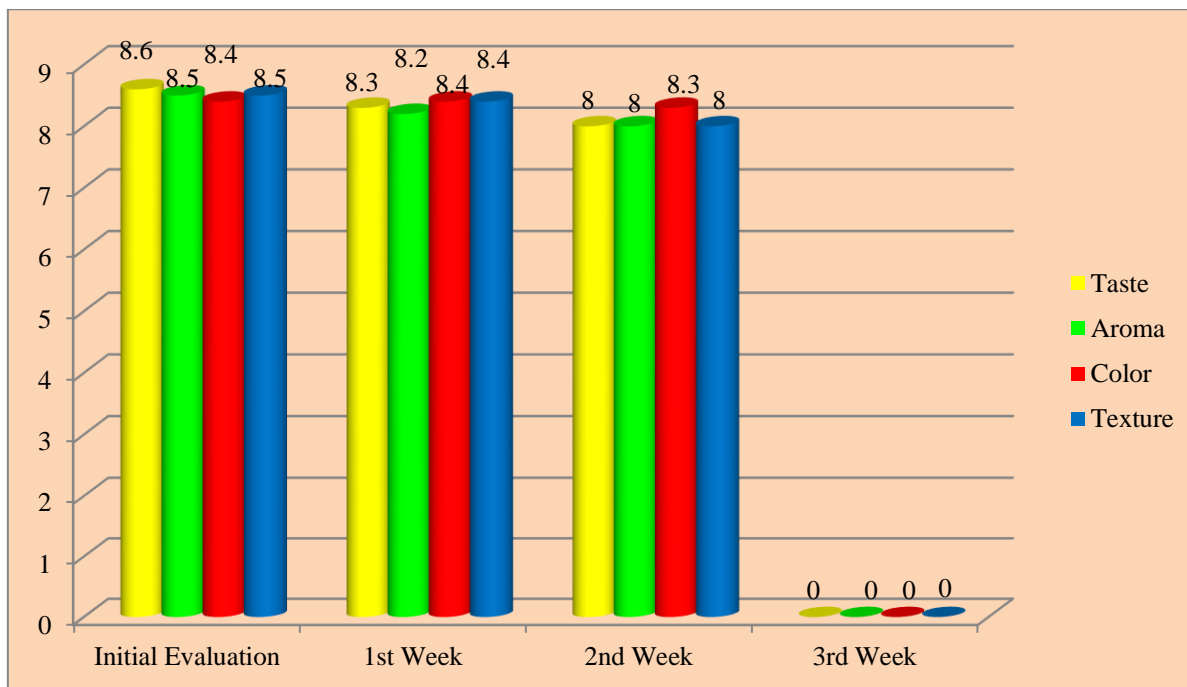


Table 4: Shelf Life Analysis (Quality Characteristics)

Table 4 shows the shelf life analysis of the developed product for three weeks through direct method. It is made by storing products under selected conditions for longer than the expected shelf life; another is by checking at regular intervals to see when spoilage begins. In view of this, the initial evaluation result of pie concerning on the shelf life of the product still focused on its physical characteristics such as taste, aroma, color, and texture. This table involves the initial evaluation result of pie which is 8.5 as well as it indicates the comparison results during the first week of storage of the product, wherein changes occurs with the result, which

became 8.3 during the first week of storage. The second week’s data became 8.1 and for the third week it shrinks to 7.4. And the product on the third was spotted to have molds on its selected parts. The result is still connected with the high moisture content of the product, the higher the moisture contents of the product the shorter its shelf life. One of the major purposes of conducting shelf life analysis is to maintain food quality, improve profitability, as well as for consumer safety (mocon.com).

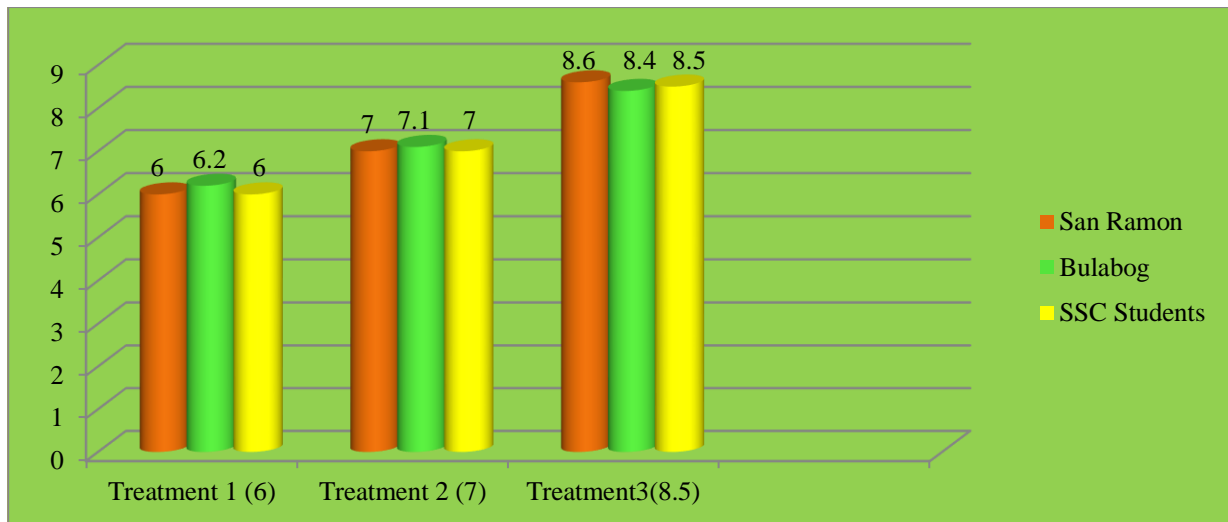


Table 5: Consumer Testing Result

The sensory evaluation result is presented in table 5. The 9 point hedonic scale that is translated in Bicol dialect was used by the panelist in evaluating the product in the three treatments conducted, (1) habuonunon or dislike extremely, (2) habuonun or dislike very much, (3) habo or dislike moderately, (4) medyo habo or dislike slightly, (5) lain gusto, lain man habo or neither like nor dislike, (6) medyo gusto lang or like slightly, (7) gusto or like moderately, (8) gustohonon or like very much and (9) gustohononun or like extremely. The most acceptable product was determined after having finished the three treatments. The product was evaluated prior to some qualifications needed to come up with a valid result. They should have the interest to taste the product, free from allergies, availability during the conduct of the evaluation, a non-smoker and in good health.

Among the treatments made the third treatment got the highest level of acceptability with a result of like very much. These simply mean that this treatment is the most acceptable in terms of its sensory attributes as compared to the other two treatments. The result shows that the entire involved panelist

from San Ramon Bacon, Bulabog and Sorsogon State College students considered treatment three as the most acceptable product as shown in the table. Treatment 2 on the other hand got the evaluation of like moderately because the proportion of pili pulp is quite high therefore the taste of the product became fatty. The evaluation result of treatment 1 was like slightly for the reason that the proportion of pili pulp is a bit low that is why it became blunt in taste in terms of the main ingredient used as well as dominated by the other ingredients present into the product.

Ultimately, the quality and desirability of a food product is determined by its interaction with the sensory organs of human beings, e.g., vision, taste, smell, feel and hearing. For this reason the sensory properties of new or improved foods are usually tested by human beings to ensure that they have acceptable and desirable properties before they are launched onto the market (Food and Drug Administration (FDA), the United States Department of Agriculture (USDA), the National Marine Fisheries Service (NMFS) and the Environmental Protection Agency (EPA).

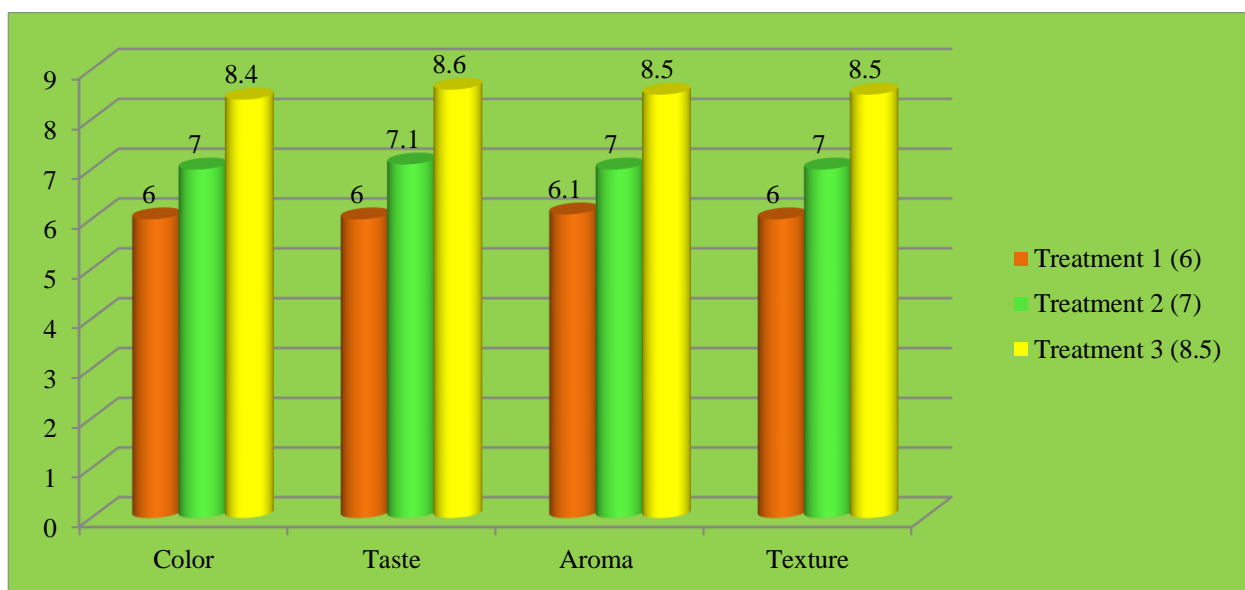


Table 6: Palatability and Acceptability of Pie

Table 6 shows the result for the palatability and acceptability of pie. Palatability is determining the precise relationship between the sensory properties of foods involving the products color, taste, aroma and texture (Rolls et.al and Hetherington et.al). Results show that treatment one is the least acceptable product which got an acceptability of six (based from the 9 point hedonic scale. This means that the proportion of ingredients of the said treatment is not that

acceptable to the respondents. As compared to Treatment 2, it got a bit higher result which is seven based on its palatability. This means that the overall factor in line with the result is the amount of ingredients used per treatment. Treatment 3 on the other hand has the overall acceptability of 8.5; the highest rate was consistently achieved by treatment 3 in line with color, taste, aroma, and texture.

Pili pulp		Banana	
Nutrition Facts		Nutrition Facts	
Serving Size (120g) Amount Per Serving		Serving Size (120g) Amount Per Serving	
Calories from Fat 0		Calories 146.40	
Calories 192.00			% Daily Values*
	% Daily Values*		
Total Fat 18.00g	27.69	Total Fat 0	
Saturated Fat 2.52g		Saturated Fat 0	
Cholesterol	0	Cholesterol 0	
Sodium 8.40mg	0.35	Sodium 0	
Total Carbohydrate 10.80g	3.60	Total Carbohydrate 38.40g	12.80
Dietary Fiber 8.40g	33.60	Dietary Fiber 4.80g	19.20
Sugars 0.80 g		Sugars 0	
Protein 2.40g	4.80	Protein 2.40g	4.80
Vitamin A 2% ,Vitamin C 19%,VitaminB-6 18%		Vitamin A 10% Vitamin C 56% Vitamin B-6 0	
Calcium 1% Iron 4% Magnesium 8%		Calcium 1% Iron 6% Magnesium 0	
*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.			

Table 7: Nutrition Information

In table 7, the nutrition information of pili pulp and banana was presented per 120 grams. Pili pulp contains 192 calories, total fat of 27.69%, Saturated fat 0%, cholesterol 0%, sodium 0.35%, total carbohydrates 3.60 %, dietary fiber which is 33.60 %, Protein 4.80 %, it also contains vitamins and minerals having 2% vitamin a, vitamin c 19%, vitamin B-6 18%, calcium 1%, iron 4% and magnesium 8%.

Banana also has a huge percentage of health benefits. It has a total of 146.40 calories, 0% fat, saturated fat 0%, cholesterol 0%, sodium 0%, 12.80% total carbohydrates, 19.80% dietary fiber, sugars 0%, protein 4.80%, vitamin a 10%, vitamin c 56%, vitamin B-6 0%, calcium 1%, iron 6% and zero magnesium.

Young coconut			Pie (Pili pulp, banana, Young coconut)		
Nutrition Facts			Nutrition Facts		
Serving Size (120g)			Serving Size (805.2g)		
Amount Per Serving			Amount Per Serving		
Calories 70			Calories 874		
% Daily Values*			% Daily Values*		
Total Fat 1.50		2.31	Total Fat 35.1g		54.00
Saturated Fat 1.50g			Saturated Fat		
Cholesterol 0			Cholesterol 58.2 mg		
Sodium 0			Sodium 224.4 mg		
Total Carbohydrate 14.00g		4.67	Total Carbohydrate 134g		44.67
Dietary Fiber 1.00g		4.00	Dietary Fiber 14.2g		56.80
Sugars 7.50g			Sugars 73.14g		
Protein 1.00g		2.00	Protein 19.6g		39.20
Vitamin A 0%	Vitamin C 0%	Vitamin B-6 0	Vitamin A 22%	Vitamin C 82%	Vitamin B-6 27%
Vitamin B-12 5%			Vitamin B-12 5%		
Calcium 9%	Iron 6%	Magnesium 0	Calcium 60%	Iron 11%	Magnesium 19%
*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be, higher or lower depending on your calorie needs.					

Table 8: Nutrition Information

Table 8 shows the nutrition information of young coconut and the developed pie. This shows that young coconut contains 70% calories, 2.31% total fat, 0% cholesterol, sodium 0%, 4.67% total carbohydrates, 4% dietary fiber, 2% protein, 0% vitamin a, 0% vitamin c, 0% vitamin B-6, 9% calcium, 6% iron and 0% magnesium.

On the other hand, the combined nutrients present in the three major ingredients used in the development of pie shows that the product contains huge health benefits. Per 805.2 grams it has 874 calories, total fat of 54%, saturated fat 0%, cholesterol 19.40%, sodium 9.35%, total carbohydrates 44.67%, dietary fiber 56.80%, sugars 73.14g, protein 39.20%, vitamin a 22%, vitamin c 82%, vitamin b-6 27%, vitamin B-12 5%, calcium 60%, iron 11%, and magnesium 19%. Nutritive value is considered to be as “hidden characteristics” of food as well as the foods microbial safety. Because unlike the physical characteristics, the hidden attributes of food can neither be seen nor felt and are measurable only by standard chemical or microbiological procedures (International Trade Centre).

V. CONCLUSION

The following conclusions were made based on the findings of this study, this includes that the pie fillings was developed through the use of mashed pili pulp, mashed banana and grated young coconut meat, that the shelf life of the product is 3 days in room temperature and 2 weeks if kept refrigerated, the third treatment represents the highest overall acceptability as evaluated by the panelist through consumer testing, the computed nutrition information of the most acceptable product shows that they are nutritious and karagomoi is feasible to be used as a packaging material.

To further improve the production of Pie the following are also recommended:

the production of pie be extended to the community to be used as a source of livelihood, look for partner agencies that are patronizing locally produced products as “Pasalubong”, strengthen the physicochemical analysis of pie by conducting another test through Food and Nutrition Research Institute (FNRI) and monitoring for the enhancement and quality production of pie should be considered to the adapted barangay of San Ramon Bacon and Bulabog.

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