

Acceptability of Musa Balbisiana (Saba Banana) Puree in Two Treatments in Making Ice Cream

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Abstract - *Musa Balbisiana or Saba is a variety of banana fruit that is nutritious and readily available in the market the whole year round. This experimental study aimed to determine the acceptability of the ice cream made from Saba banana puree in two treatments (treatment 1- cooked puree and treatment 2- uncooked puree).*

Data gathered were described and analyzed using a special Analysis of Variance. The sensory characteristics of the ice cream in two treatments were compared with one another based on the 9-point hedonic scale utilized by trained panelist in the education sector in secondary, tertiary and graduate school level that specialized in food related discipline such as Food Technology, Food Service Management, Technology and Livelihood Education- Food Trades and Hotel and Restaurant Management.

Results indicated that in treatment 1(cooked puree) the taste and texture of the ice cream were liked extremely however its color was rated liked very much, while in treatment 2 (uncooked puree) the texture and color were rated liked moderately while its taste was rated liked very much.

A comparison of the sensory characteristics between the two treatments revealed that there is a significant difference in terms of taste, texture and color and overall acceptability of the Saba banana ice cream.

It is then recommended that in preparing Saba banana puree using treatment 1 (cooking method), the fruit should be subjected in numerous sieving process using a fine mesh siever or sifter to produce good quality puree texture.

Keywords: *Saba banana, ice cream, creaming, blending, freezing, enzymatic browning, ascorbic acid, food shelf life testing*

INTRODUCTION

Saba banana (*Musa balbisiana*), is a triploid hybrid banana cultivar originating from the Philippines, primarily a cooking banana, it is usually boiled, steamed and fried. It is one of the most important banana in the Philippine Cuisine. The high demand for banana in the Filipino diet owing to its nutritive value and affordable price compared to mango and pineapple. It is commonly used in processing banana chips and catsup [1]. With the growing awareness on healthy food consumption, substantial increase in value added products derived from banana encouraged the banana industry to augment the raw material production. (Food Development Center, National Food Authority)

Bananas constitute 73% of consumer fruit intake. They are an important food item for Filipinos, a source of income for local farmers and a foreign exchange earner for the country. They are the leading Filipino fruit crop in terms of area, volume and value of production. The average annual land yield of the Philippines is 9.4 ton/ha. while big plantations produce about 40 ton/ha. [2].

Banana pulp is composed of soft, easily digestible flesh with simple sugars like fructose and sucrose that when eaten replenishes energy and revitalizes the body. Its pulp is firm when the fruit is not ripe, but softened during maturation, so the puree maybe obtained [3]. This pulp, comprising 75% water, is

among calorie-rich of non-oil fresh fruits. It also contains approximately 20g of carbohydrates in total per 100g of fresh pulp, out of which fiber 2g per 100 g fresh pulp [4]. Ripe banana is an excellent food for effort, because its pulp is sugar-rich and easily digested, and its content in potassium and magnesium is interesting for muscle contraction control. Bananas are popular for its aroma, texture and easy to peel and eat, besides rich in potassium and calcium as well as low in sodium content [5].

The fruit also contains good amount of soluble dietary fiber (7% of DRA per 100g) that helps normal bowel movement. It is also a good source of vitamin-B6 and a moderate source of vitamin C. Fresh bananas provides adequate level of minerals like copper, magnesium and manganese. The banana is full of proteins and the sugar provided gives a lot of energy best for those engage in sports requiring endurance. Moreover, it contains selenium, magnesium, iron and lots of vitamins and is recommended for salt-free diets because of its low sodium chloridium content.

Banana puree is important as infant food and can be successfully canned by the addition of ascorbic acid to prevent discoloration. The puree is produced on a commercial scale in factories close to banana fields and packed in plastic-lined #10 cans and 55-gallon metal drums for use in baby foods, cake pie, ice cream, cheese cake, doughnuts, milk shakes and many other products. Fruit puree is the principal component of the presently prepared blend. The term "puree" has been used in the art to refer to both heat treated, e.g., boiled, and untreated food pulp. As used herein, however, "puree" is meant to refer only to unheated-treatment of the whole fruit pieces which have been mechanically transformed into fluids.

Ice cream is a frozen food made from a mixture of dairy ingredients, containing at least 10% milk fat before the addition of bulk ingredients, such as flavorings and sweeteners [6]. Ice cream or Sorbetes is an all-time favorite dessert or snack among Filipinos in our country since we are in a tropical part of the globe.

It is basically made from milk, cream, sweetener and flavorings like vanilla, chocolate and cheese. It is made from either cooked custard or uncooked base. Ice cream made with eggs and cream is higher in fat than ice "cream" made with skim milk (low-fat or nonfat). As a rule the higher the fat content of the base mixture, the creamier the texture; incorporating gelatin, egg substitute, or lecithin (an emulsifier made

from soya beans) into mixtures made with skim milk makes the texture creamier. Nowadays ice cream makers added fruit-flavored variations in the market such as ube, mango and melon, which suits the taste of the Filipino consumers in any age. Most fruits were used to flavor ice cream that contain naturally occurring pectin and a certain amount of fiber as Saba banana had. Both of these substances help to keep the milk fat and water molecules in an even suspension as they freeze.

With this information at hand Saba banana has a greater potential to be utilized as a fruit flavoring in making ice cream.

OBJECTIVES OF THE STUDY

Generally the study determines the level of acceptability of Saba banana puree in two treatments in making ice cream in terms of their quality attributes. Specifically it aims to describe the acceptability of banana ice cream yielded from the two processing methods of preparing puree in terms of their quality attributes such as taste, color and texture; to compare the acceptability banana ice cream yielded from the two processing methods of preparing puree in terms of their quality attributes and to compare the quality attributes of banana ice cream yielded from the two processing methods in preparing the puree.

MATERIALS AND METHODS

Processing of Saba Banana Puree

- a. *Raw Materials:* Ripe Saba banana fruit and Evaporated milk
- b. *Tools and Equipment:* Plastic hand gloves, knife, chopping board, trays, mixing bowls, 50 and 70 mesh strainer, electric blender, double sauce pan and rubber scrapper
- c. *Procedure:*

Saba banana fruit weighing approximately 2 kilograms were washed, peeled, cut into halves and seeds were removed. The fruit were then chopped into smaller pieces and blended with evaporated milk to produce puree. Two processes were conducted to produce a good quality puree. First processing method (T1) was cooking the puree using a double sauce pan under medium heat fire for 1 minute at 60 C. The second process (T2) is uncooked method, the puree has not been subjected in any heat treatment procedure. Puree clumps that has been developed in the two processing method were removed through sifting.

Preparation of the Saba banana ice cream

- a. *Raw Materials:* Processed Saba banana puree (T1 and T2), All-purpose cream and Condensed milk
- b. *Tools and Equipment:* Mixing bowls, Rubber scraper, Electric mixer, 80 mesh Sifter, ladle, ice cream cups and freezer
- c. *Procedure:*

All-purpose cream was chilled overnight and blended with condensed milk to make the cream mixture. Saba banana puree in two treatments were then mixed with the cream mixture and subjected to a high speed mixing with the use of electric mixer.

The processed cream and saba banana puree mixture were passes through a fine mesh sifter to eliminate extra clumps and subjected to overnight freezing.

Saba banana ice cream made from the two processing methods in preparing the fruit puree was made to determine the acceptability of the product in terms of their quality attributes.

Sensory evaluation is the process of using our senses (taste, smell, touch, sight) and applying them to determine the acceptability of foods. Simply, it is assessing the food to make sure that it looks, smells, and tastes delicious [7].

To measure the acceptance of the evaluators the 9 point Hedonic scale was used. The panelist rated the two samples from 1-9 where 1 corresponds to “dislike extremely” which means least accepted and 9 corresponds to “like extremely” which means the most accepted product.

To compare the significant differences between the two banana ice cream in terms of their sensory characteristics, a Special Analysis of Variance (ANOVA) was employed.

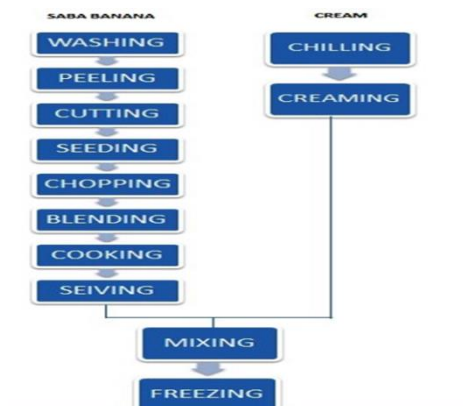


Figure 1. Saba banana Ice Cream Processing Framework

RESULTS AND DISCUSSION

Table 1. Mean acceptability of the quality attributes of banana ice-cream yielded from the two processing methods.

Quality attributes	Banana Ice-Cream			
	T1 – Cooked Puree		T2- Uncooked Puree	
	Mean	Description	Mean	Description
Taste	8.8	Liked extremely	7.6	Liked very much
Texture	8.5	Liked extremely	7.0	Liked moderately
Color	8.2	Liked very much	6.7	Like moderately
Overall Mean	8.5	Liked extremely	7.1	Liked moderately

Table 1 presents the computed mean scores for taste, texture and color in the two processing methods in preparing Saba banana puree in making ice cream.

It can be noted that the mean score of treatment 1 with respect to taste and texture were 8.8 and 8.5, respectively described as liked extremely, while the color was rated liked very much as indicated by its mean score of 8.2

The overall mean score of 8.5 in terms of taste, texture and color implies that the cooked Saba banana puree as ingredient in making ice cream was liked extremely by the panelists.

This support the studies conducted by Charles Sims and Robert Bates in 1994 entitled Challenges to tropical fruit juices: Banana as example stated that heating whole bananas or puree effectively inhibited browning of color and the blanched puree (30 seconds at ~90°C with rapid cooling) can also be frozen in bulk, with better retention of volatiles [8].

While the mean score of treatment 2 with respect to texture and color were 7.0 and 6.7, respectively described as liked moderately, while the taste was rated liked very much as indicated by its mean score of 7.6.

The overall mean score of 7.1 in terms of taste, texture and color implies that the uncooked Saba banana puree as ingredient in making ice cream was liked moderately by the panelists.

Table 2 T-test analysis on quality attributes acceptability differences of banana ice cream yielded from the two processing methods.

Variables	Computed t-value	Critical t-value	Result
Taste	8.27	2.02	Significant
Texture	9.75	2.02	Significant
Color	10.75	2.02	Significant

As shown from Table 2 the computed t-value for the taste, texture and color between the two treatments were 8.27, 9.75 and 10.75 with the critical t-value of 2.02

Result showed that there is a significant difference in the quality attributes between the two processing methods employed in the preparation of Saba banana puree in making ice cream as perceived by the trained panelist.

Table 3 ANOVA table on quality attributes acceptability difference of banana ice cream (T1)

Source of Variation	Sum of Squares	df	Mean Square	F	Sig
Between Groups	3.600	2	1.800	9.000	.000*
Within Groups	11.400	57	.200		
Total	15.000	59			

*Significant

As seen from Table 3 presents that the special ANOVA on the quality attributes of Saba banana ice cream. Results showed that there is a significant difference on the quality attributes as it was attested to by the obtained f-ratio (9.000) between and within groups. It can be noted that the sum of squares between groups is 3.600 with the degrees of freedom of 2 with the total mean score of 1.800 while the sum of squares within groups is 11.400 with 57 degrees of freedom as reflected to its total mean score of .200

The foregoing result implies that the scores for overall acceptability of the two treatments were significantly difference as shown in Table 1. The taste and texture in treatment 1 is liked extremely while the color is liked very much. In treatment 2 the taste is liked very much while the texture and color is liked moderately. The overall mean score of Treatment 1 is 8.5 described as liked extremely while in treatment 2 is liked moderately with the mean score of 7.1

Table 4 ANOVA table on quality attributes acceptability difference of banana ice cream (T2)

Source of Variation	Sum of Squares	df	Mean Square	F	Sig	RECOMMENDATIONS
Between Groups	8.400	2	4.200	18.415	.000*	
Within Groups	13.000	57	.228			
Total	21.400	59				

*Significant

As seen from Table 4, result showed that there is a significant difference in the quality attributes of Saba banana ice cream in two treatments in terms of taste, texture and color as shown in Table 2. This was attested to by the obtained f-ratio (18.415) between and within groups. It can be noted that the sum of squares between groups is 8.400 with the degrees of freedom of 2 with the total mean square of 4.200 while the sum of squares within groups is 13.000 with 57 degrees of freedom as reflected to its total mean score of .228

The foregoing result implies that the scores for overall acceptability of the two treatments were significantly difference as shown in Table 1. The taste and texture in treatment 1 is liked extremely while the color is liked very much. In treatment 2 the taste is liked very much while the texture and color is liked moderately. The overall mean score of Treatment 1 is 8.5 described as liked extremely while in treatment 2 is liked moderately with the mean score of 7.1

CONCLUSIONS

On the basis of the aforementioned findings, it can be concluded that in preparing fruit based ice cream using banana. Cooked Musa Balbisiana (Saba banana) Puree was highly accepted by the trained panelist in terms of taste, texture and color. It was found out that through heating process of the puree at 60 C for one minute with the addition of ascorbic acid the natural flavor, color and aroma of the banana puree was preserved. Generally the Saba banana fruit is nutritious and highly accepted in making ice cream. It was also found out that the saba banana ice cream was feasible in terms of its marketability and productivity with its good potential to attract buyers. In this sense we believe that our study will be able to contribute on the utilization of the Saba banana fruit in terms of product development. The study could help the local banana farmers in the different parts of the Philippines specifically in the MIMAROPA Region to increase their profit out of Saba banana production, likewise the micro, small and medium enterprises or small food processor may engaged themselves in value adding product like banana ice cream.

RECOMMENDATIONS

The researchers recommends that in preparing Saba banana puree using treatment 1 (cooking method), the fruit should be subjected in numerous sieving process using a fine mesh siever to produce finer quality puree texture. As a significant aid to enzymatic browning prevention in processed banana products, it is recommended that ascorbic acid should be incorporated into the puree prior to the heating process. In this manner, the processor and consumer will gain appreciable leeway in product handling.

Further similar study should be conducted to develop a good quality of homemade fruit based ice cream in terms of the ratio and proportion of the raw materials such as fruits, milk and sweetener. It is also recommended to conduct food shelf life testing to determine the stability of the critical physical and chemical characteristics of the product.

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