



Nutritional Content of Differently Treated Mangrove Apple Powder

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ABSTRACT

Mangrove apple is highly nutritious fruit abundant in Bangladesh. In rainy season vast amount of mangrove apple grown in Bangladesh. Especially it grows in the coastal area nearest Sundarban. In this study three different sample and one functional food were taken for preservation such as raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple. Mangrove apple shell thickness is tiny. So ethane forms it very quickly and it will dust after few days. So we can consume it by preservation. Nutritional components such as moisture, ash, fat, protein, carbohydrates contents of samples (mangrove apple powder) obtained from the three different sample and the functional food. The moisture content of mangrove apple raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 11.86%, 11.27%, 10.45 % and 52.63% respectively. The protein content of raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 11.45%, 9.38%, 9.79% and 13.61% respectively. It showed that mangrove apple have been containing very high amount of protein content. The fat content of mangrove apple raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 18.72%, 14.55%, 12.62% and 8.14% respectively. This proved that mangrove apple is also a good source of vegetable fat. The Ash content of mangrove apple raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 6.10%, 5.45%, 5.86% and 5.16 % respectively. The Carbohydrates content of mangrove apple raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 51.87%, 59.35%, 61.28% and 20.46% respectively. This study stated that, mangrove apple is a rich source of nutrients and could be a good source of food for human consumption.

Key words: *Mangrove Apple, Nutrition, Raw powder.*

INTRODUCTION

Mangrove Apple:

Sonneratia apetala (Buch.-Ham.) is a true mangrove, belonging to the family Lythraceae. It is called keora in Bengali and mangrove apple in English. It is a native plant abundantly grown in the world's largest tidal halophytic forest, the Sundarbans' along with coastal areas in Bangladesh, India, Myanmar, Thailand, Malaysia, Indonesia, Sri Lanka, and China, etc.

Research shows that, mangrove apples contain the shading specialists archin (emodin) and archicin (chrysophanic corrosive), which have hostile to oxidizing, diuretic, and detoxifying impacts. They additionally fortify veins, cure stomach ulcers, decrease assimilation of sugars and fat, and lessen pulse (M.vietnamheritage.com.vn, 2019). The whole fruit, both pericarp and seed, is extensively consumed following cooking and through other preparations. People adjacent to the Sundarbans' generally consume the fruits by cooking with pulses and small shrimps.

Source of Food and Nutrition:

The logical strategy of detailing jam, natural product bar and other organic product items has opened a pay choice in the contemporary period. These organic product items are healthfully rich; however they are likewise monetarily achievable to start a little scale industry. Conservation and preparing of organic product items are additionally huge to ration the nature of the finished results. (Anon, 2019)

A little amount of starch may likewise exist in natural product; however it commonly changed to sugars during the maturing procedure. Little amounts of protein and fat are found in organic products. Fats are most ordinarily related with the waxy fingernail skin surface of the organic product skin. It is likewise a significant wellspring of Vitamin-C. Research says that regarding 65% Vitamin-C is available in this crude nourishment. It is significant for human eating regimen for initiating the antibodies and battle ailments in the body. Diverse nourishment items like jam, jam, organic product bar and preserves are planned from crude consumable natural products. Natural product jam, jams and preserves are set up by cooking organic products (pieces, pulps or squeeze) with sugars, gelling operators (normally gelatine) and eatable (typically natural) acids and concentrating the blend until a trademark and appropriate consistency is found.(Pramanick, Zaman and Mitra, 2019).

Nutrients of Mangrove Apple and their function:

Main proximate nutrients of Mangrove Apple are protein, fat and carbohydrate. These nutrients provide energy. They work for growth and metabolism. Protein is essential for building and repairing tissues. These nutrients also regulate the body processes.

OBJECTIVES OF THE STUDY

- 1.To assess the Nutritional content of mangrove apple pulp.
- 2.To analysis the taste attribute of the product.

MATERIALS AND METHOD**Collection of Sample**

Mangrove apple was collected from the Sundarban from the Satkhira Distict. Nutritional content was assay at Food Engineering Lab of Daffodil International University, Asulia, Savar, Dhaka. The research conducted on Mangrove apple grown in Bangladesh to estimate the proximate composition (Such as Moisture content, Ash, Protein, Fat).

Raw Material**Sample Preparation**

Mangrove Apple was treated and three types of samples was prepared by treating the fruits differently for the analysis of its nutrition value.

- Raw mangrove apple powder.
- Dry pulp powder (by blanching).
- Dry pulp powder (by boiling)

Raw mangrove Apple powder preparation

Washing: Firstly, washed the mangrove apple properly for clean wax and dirt from it.

Pilling: Then pill it one by one.

Drying: Pulp were Dried for 8 hours in 47.2°C or 116.96°F and the Relative humidity (RH) 32%.

Grinding: powder was made from dried fruits in the grinder.

Dry pulp powder (by blanching) preparation:

Washing: Firstly the raw fruit was washed properly and rinse it to water for several times. Then it was prepared for the next step.

Blanching: the mangrove apple blanching in 85-90°C or 185-194°F for 7 minutes to stop the enzymatic activity and microbial growth.

Pulp extract: Firstly shell was removed from the fruits. Then it was blend with a blender to make pulp.

Drying pulp: Pulp was dried for 6 hours in 47.2°C or 116.96°F and Relative humidity (RH) 32%.

Grinding: Grinding is the last process of the drying pulp (by blanching) powder making. In the grinder give the dry pulp and grinding it into powder.

Production of Mangrove Apple Jam

Already from this paper we know that mangrove apple is rich in nutrient. People also found a new variety of food. So we can introduce people a new variety of food from mangrove apple. Some research paper say that from mangrove apple we can produce jam, jelly and fruits bar soft drinks. So from those research I want to introduce people a new variety of food by producing mangrove apple jam. Every step of jam making process is given below:

Procedure

Washing: Firstly washing the raw fruits properly and rinse it to water for several time. It will remove dirt and wax from the fruits.

Preparation of jar and lid: Clean the glass jars and lids and put them into a large saucepan. Fill the saucepan with water so that the jars and lids are concealed and heat until the water boils. Let the water boil for about 5 minutes. Eliminate the jars and turn upside down so that the water can all drain out. Do not dry them with a dirt cloth.

Steaming: For making jam, the fruit needs to be softened (turned into pulp). So for soften the shell of the mangrove apple give the steam treatment for 10 minutes. After 10 minutes the shell will be soften. We can take it beach because man can't consume its beach. And by steaming, the production loss will be minimize.

Pulp Extract: Then Take the shell from the fruits and give it to the blender and blend it very smoothly. F

Proximate Analysis Method

Drying of Mangrove Apple: White Mangrove Apple distributed on a tray in the solar tunnel dryer at 47.2°C. A digital balance with accuracy ± 0.001 g (Gikuru and Olwal, 2005) was used to measure the mass of samples. Shells of mangrove apple were dried until the readings became constant. The readings were taken in three replicates and average values were used for further analysis.

Determination of moisture: Determination of moisture content of the dried Mangrove Apple powder and jam was conducted by AOAC method (AOAC, 1979).For this intention washed some of Mangrove Apple and weighted taken. The sample was allowed to dry into the oven dryer at 105 degree Celsius for 4 hours in order to remove the moisture from the cabbage sample. Drying, cooling, and weight was recognized. Moisture content was calculated by using following formula.

Calculation of moisture (%)

$\% \text{ of moisture} = \text{Weight loss} / \text{original weight of the sample taken} \times 100$

Determination of Ash: The Mangrove Apple sample (2-3grams) were taken, weighted & ignited into the crucible. Then it transferred into the muffle furnace held at the dark side of the furnace at a rate of 600 degree Celsius for 6 hours. Until the residue was white. Finally, the percentage of the ash content was calculated.

$$\% \text{ of ash} = \text{weight of the dry} \frac{\text{sample}}{\text{original}} \text{ weight of the sample taken} \times 100$$

RESULTS & DISCUSSION

Proximate Composition of Sample

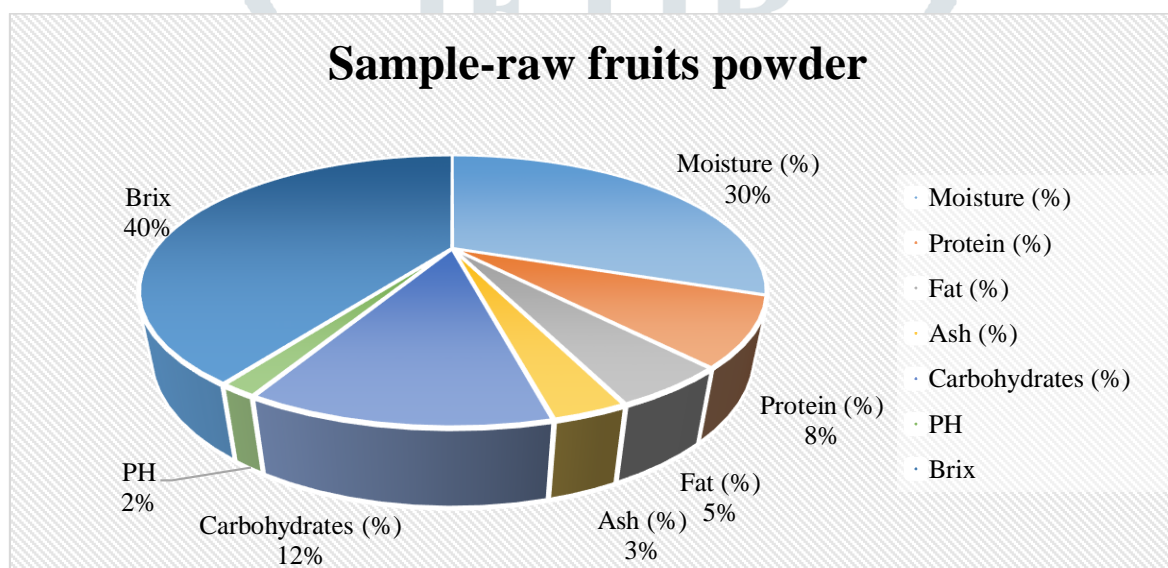
The research was done to find out the chemical composition of Mangrove apple in order to estimate its nutritional value.

Proximate Analysis of the Mangrove Apple Powder in three different (Raw fruits powder, pulp powder by blanching and pulp powder by boiling) sample:

Table 1: Nutrition Composition differently Treated Mangrove Apple

Parameters	Sample (raw fruits powder)	Blanched pulp powder	Boiled pulp powder
Moisture (%)	11.86	11.27	10.45
Protein (%)	11.45	9.38	9.79
Fat (%)	18.72	14.55	12.62
Ash (%)	6.10	5.45	5.86
Carbohydrates (%)	51.87	59.35	61.28
Energy (Kcal/100gm)	421.76	405.87	397.86

Proximate Compositions of the Mangrove Apple jam



Moisture content: The moisture content of mangrove raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 11.86%, 11.27%, 10.45 % and 52.63% respectively. It proved that 3 different types of treated powder and jelly's different proportion of moisture content.

Protein content: The protein content of mangrove raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 11.45%, 9.38%, 9.79% and 13.61% respectively. It showed that mangrove apple have been containing very high amount of protein content.

Fat content: The fat content of mangrove apple raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 18.72%, 14.55%, 12.62% and 8.14% respectively. So it proved that cabbage is very much vegetable fat content.

Ash content: The Ash content of mangrove raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 6.10%, 5.45%, 5.86% and 5.16 % respectively.

Carbohydrate content: The Carbohydrates content of mangrove apple raw powder, blanched pulp powder, boiled pulp powder and jam of mangrove apple were 51.87%, 59.35%, 61.28% and 20.46% respectively.

Energy content: The energy content of mangrove apple raw powder, blanched pulp powder, boiled pulp powder were 421.76 kcal/100gm, 405.87 kcal/100gm, 397.86 kcal/100gm respectively.

3.3 Sensory analysis by 9 point scale Hedonic test: A Hedonic scale incorporates a progression of verbal proclamations that pass on a degree of like or abhorrence. The most widely recognized is the 9-point hedonic scale planned by Perham and Girardot in 1952.

Here the taster makes remarks about the products' appearance, taste, odour and texture.

Product Name: Mangrove Apple Jam No. Of Consumer: 151

Table 2: Sensory Analysis

Score	Product (Mangrove Apple Jam)	Percentage
Like Extremely	29	19.20%
Like Very Much	45	29.80%
Like Moderately	34	22.51%
Like Slightly	13	8.60%
Neither Like nor Dislike	5	3.31%
Dislike slightly	5	3.31%
Dislike moderately	7	4.63%
Dislike very much	3	1.98%
Dislike extremely	9	5.96%

Here we found that, maximum number of Respondents response in like very much (45) categories. But due to a sub group people like moderately (34) and like slightly (13) scores the same. It also show that respondents belongs to dislike group is very few than Like group.

CONCLUSION

Limitations of the study

Main limitation was time constraints, hard work, lack of appropriate technology and machineries. Instruments and other necessary things were not enough for the present analysis.

Mangrove apple were selected for the analysis of nutritional composition and to produce new food from it. From the proximate analysis it showed that, mangrove apple are rich in nutrients protein, vegetable fat and minerals. The sensory acceptance also showed that, large scale tasty and nutritive food can be made from mangrove apple. Further study is required to study the potential of mangrove apple pulp powder as functional food ingredients.

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