



STANDARDIZATION AND FORMULATION OF TAMARIND INCORPORATED WITH BANANA HALWA

¹K. Sivaraga, ²S. Yamuna Valli

¹UG Student, ²Assistant Professor

¹Department of Food Science and Processing Management,

¹Subbalakshmi Lakshmi pathy College of Science, Madurai, India

Abstract: Tamarind is a traditional Indian tree, which can even grow in dry regions of Africa. History of tamarind started at tropical areas of African continents. Tamarind is rich in magnesium and calcium. Banana is a tropical traditional Indian crop. Which has even placed in ancient tamil scriptures as Mukkani. There are more than 150 varieties of Banana. India is the largest producer of Banana. Banana is a good source of fibre and potassium. This project aims to combine these nutritious compositions in presentable way. This study focuses on the preparation of halwa from tamarind and banana, sensory evaluating the different variations and analysing the nutritional benefits of the product. Halwa is prepared using tamarind extract, banana pulp, jaggery, binders like corn flour, and some minor ingredients like cardamom for flavour enhancement. Typical steps in halwa production are pulping, mixing, and heating. Tamarind extract and banana pulp were developed by incorporating various proportions. The halwa was prepared by blending ingredients in four different variations. Variations are made of tamarind extract and banana pulp in the following proportions such as 23.4g of Tamarind pulp with 7.8g of banana pulp, 15.6g of Tamarind pulp with 15.6g of banana pulp, 7.8g of Tamarind pulp with 23.4g of banana pulp, and 1.5g of corn flour, 62.5g of jaggery and 1.5g of cardamom for per 100g of Halwa. Organoleptic evaluation is done by the sensory panelist to select the sample that is more acceptable and preferable in different sensory characteristics. Among them, 7.8g of tamarind extract and 23.4g of banana pulp are the acceptable proportions. This proportion is standardized for the nutrient analysis of the sample. The tamarind halwa obtained more positive responses by obtaining a similar texture and colour of the control.

Keywords: Halwa, Tamarind, Banana, Micronutrients

1.INTRODUCTION:

Tamarind (*Tamarindus indica*), is an evergreen tree that belongs to the pea family (Fabaceae) and originated from tropical Africa. It is widely grown in tropical and subtropical regions for its edible fruit, and its sweet and sour pulp is widely used in food, beverage, and traditional medicine. This plant is especially common in the Indian subcontinent, Central America, and Mexico and is a common ingredient in the cuisines of these regions. The tree is also grown as an ornamental and used for woodwork. Tamarind pulp is mainly used for cooking in South and Southeast Asia, Mexico, the middle east, and the Caribbean. The seeds and leaves in the Tamarind are also edible. Tamarind pulp is used in sauces, marinades, chutneys, beverages, and desserts. It is also one of the ingredients of Worcestershire sauce which is popular in British.

Tamarind has played a vital role in ancient medicine. It is commonly used to treat diarrhoea, constipation, fever, and malaria. The bark and leaves of the Tamarind tree were also used to heal wounds in ancient days. The polyphenols present in Tamarind have antioxidant and anti-inflammatory properties which can play a role against diseases like heart disease, cancer, and diabetes. Tamarind is highly rich in magnesium. It also consists of more calcium compared to other plant foods. The combination of these two minerals, along with weight-bearing exercise could help to prevent osteoporosis and bone fractures. The body must need vitamin D to utilize calcium. Tamarind adds a tangy flavour to savoury dishes, however, consuming too much can cause side effects. Tamarind side effects range from acid reflux to a higher risk of dental problems. Tamarind can act as a vasoconstrictor and cause blood vessels to narrow.

Banana, a fruit of the genus *Musa*, family *Musaceae*, is one of the most important fruit trees in the world. Banana is grown in the tropics and although most widely consumed in these regions, it is loved around the world for its taste, nutritional value, and year-round availability. Cavendish, or dessert, bananas are most often consumed fresh, although they can be fried or mashed and chilled in pies or puddings. They can also be used to flavour muffins, cakes, or bread. Cooking varieties, or bananas, are more starchy than sweet and are widely grown as a staple food in the tropics; they are cooked when cooked or undercooked. One ripe fruit contains up to 22% carbohydrates and is rich in fibre, potassium, manganese, and vitamins B6

Bananas require a warm tropical climate with enough rainfall and well-drained soils to grow. They are usually grown on plantations, often with hundreds of workers planting and harvesting bananas for the world market. Banana are originated from Southeast Asia and it grows in warm climate around the world. Bananas are rich in Soluble fibre which may help to improve blood sugar level. It may support digestive health. It contains pectin which prevent constipation and soften stools. Banana are good source of potassium which plays a vital for heart health. It also helps to lower blood pressure.

Mainly in the form of powder, chili sauce, candies, chutneys such products are made from tamarind. So, I invented a new Halwa product made from tamarind and banana. Bananas are incorporated to reduce the sourness of Tamarind Halwa.

II. MATERIALS AND METHODS:

Method

Raw materials needed for the preparation of Tamarind halwa are procured from the nearby market. The products were proportionated, weighed and cooked at the proper conditions and recorded properly in the Galley of Subbalakshmi Lakshmipathy College of Science, Madurai. The preparation of tamarind halwa with banana is illustrated in Figure 1.

Preliminary preparation of selected ingredients:

The fully mature, disease-free, fresh tamarind and banana were selected for the preparation of halwa. The procured raw materials such as tamarind, banana, jaggery and cardamom were cleaned to remove dirt, dust, stones and other foreign material. The tamarind and banana were ground in a mixer to make a pulp.

Standardization of Tamarind Banana Halwa

Halwa was prepared from the different proportions of tamarind and banana with the addition of jaggery, corn starch, cardamom and ghee as per requirements. These different proportions of halwa will be determined or finalized by the sensory evaluation method.

Table 1 - Proportions of ingredients used in the development of samples IBH 1, IBH 2, IBH 3

S.No	Ingredients	Quantity (g)			
		IBH 1	IBH 2	IBH 3	Control
1.	Tamarind	75g	50g	25g	100g
2.	Banana	25g	50g	75g	-
3.	Jaggery	200g	200g	200g	200g
4.	Corn flour	5g	5g	5g	5g
5.	Ghee	10g	10g	10g	10g
6.	Cardamom	5g	5g	5g	5g

The weighed tamarind was cleaned to remove seeds. Then it was soaked in water for 30 mins. The tamarind and banana were ground to make pulp. The tamarind banana halwa was prepared by tamarind pulp, banana pulp and jaggery according to different proportions. These pulps were thermally processed at 80° C for 20 mins. After heating the halwa were spread in a tray containing butter sheet. Then the halwa were cutter into square shape. The halwa was prepared as mentioned in the flow diagram.

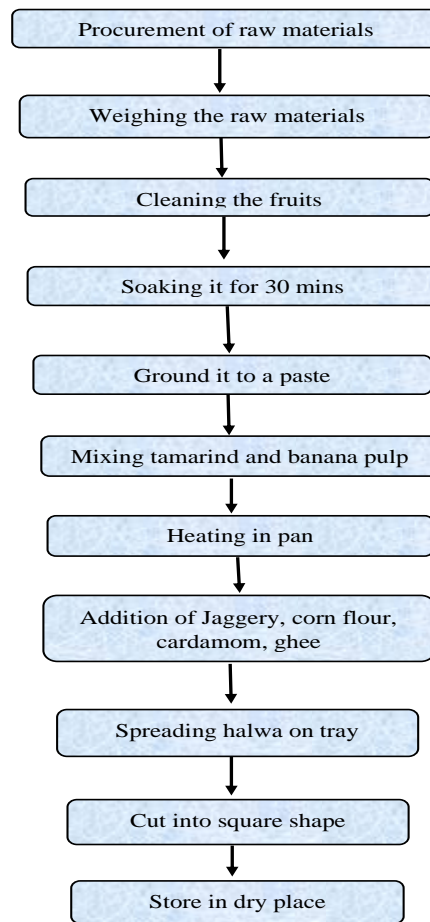


Fig 1 - Imli Banana Halwa preparation

Organoleptic or Sensory Evaluation

The developed food product with different variations was evaluated by the trained, semi-trained and consumer panels by using a 5-point scale hedonic rating.

Table 2 - Mean score obtained for the overall acceptability of Imli Banana Halwa

Sensory Attributes	Sample A	Sample B	Sample C	Sample D
Appearance	3.98	4.36	4.63	4.48
Colour	4	4.36	4.51	4.21
Flavour	3.88	3.84	4.19	4.17
Texture	3.19	4.09	4.36	4.40
Taste	3.75	4.05	4.48	4.19
Overall mean score	3.76	4.14	4.434	4.29

Among the developed products, the overall mean score in sample C - IBH 3 was highly desirable and it is highly acceptable.

Nutritive value of the acceptable standardized Imli Banana Halwa (IBH):

Energy present in Imli banana halwa is 957.62. Protein present in Imli banana halwa is 2.781. Fat present in Imli banana halwa is 3.516. Mineral present in Tamarind Jackfruit Fruit Bar is 2.687. Fibre present in Imli banana halwa is 2.303. CHO present in Imli banana halwa is 228.513. Calcium present in Imli banana halwa is 219.15. Phosphorous present in Imli banana halwa is 139.3. Iron present in Imli banana halwa is 9.6345. Carotene present in Imli banana halwa is 73.5. Thiamine present in Imli banana halwa is 0.0435. Riboflavin present in Imli banana halwa is 0.0825. Niacin present in Imli banana halwa is 0.574. Vitamin C present in Imli banana halwa is 6.

These nutritional values are calculated through the book of Nutritive value of Indian foods by C. Gopalan, B. V. Rama Sastri and S.C. Balasubramanian.

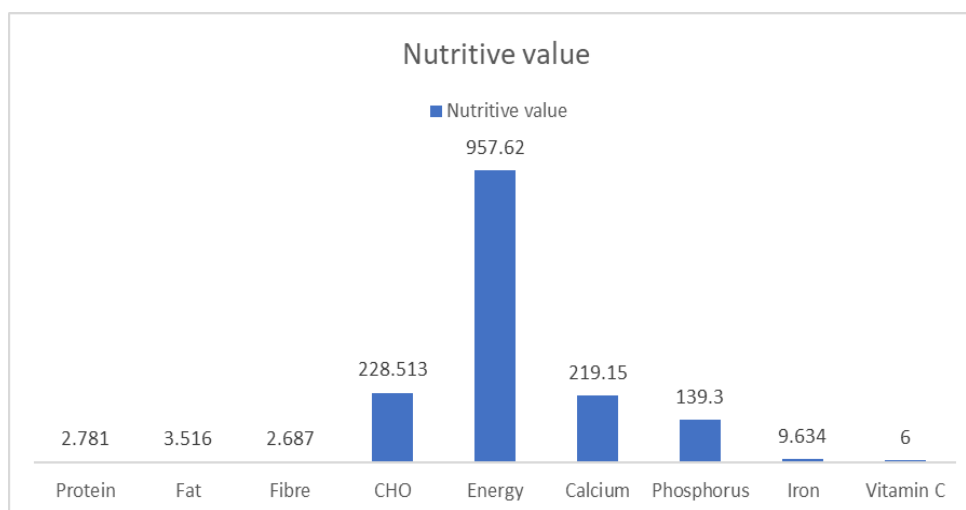


Figure 3 - Nutritive value for IBH 3

Packaging

For my product Imli banana halwa, I had chosen polyethylene terephthalate (PET) or aluminium foil as packaging material. These packaging materials are used to extend the shelf life of the halwa which leads to maintaining the quality of the product. The standardized sample of IBH 3 was packed in PET or aluminium packaging material.

III. RESULT AND DISCUSSION

The sensory outcome revealed the developed products' overall mean score in sample IBH 3 was highly acceptable. The result revealed that sample IBH 3, secured the highest score in all the sensory attributes which was more or less equal to the other developed product.

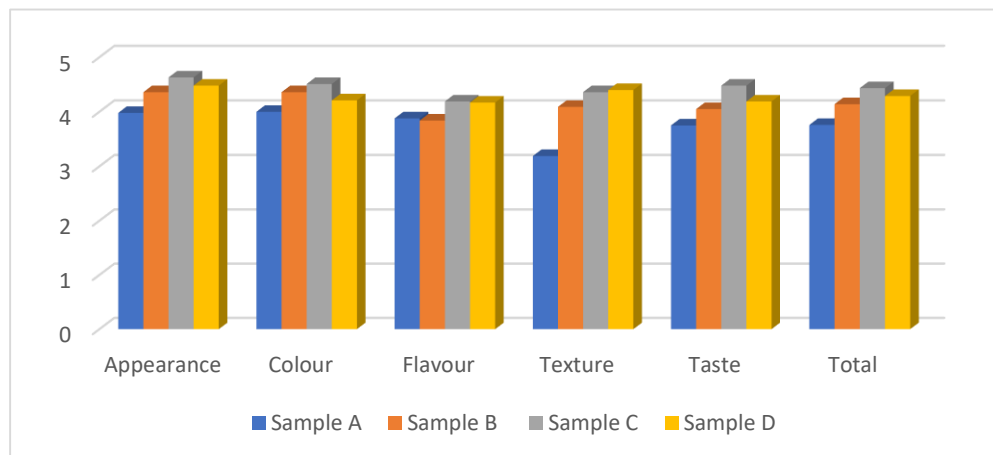


Figure 4 - Score of samples

Imli banana halwa is rich in energy and carbohydrates and contains less fat. The packaging material used for IBH helps to extend the shelf life of the product for 10 days.

There are no such products were developed like tamarind incorporated halwa. This tamarind incorporated with banana halwa was developed to provide the taste of tamarind candy which will be consumed after the food for digestion.

Reference

1. C. Gopalan, B. V. Rama Sastri and S.C. Balasubramanian (1989), Nutritive value of Indian foods, National Institute of Nutrition, Page No: 47 – 57.
2. Amerine MA, Pangborn RM, Roseler CB. Principles of Sensory Evaluation of Foods. 1965, Academic Press, New York, 350 – 376.
3. E Kiranmai et.al, 2018, Standardization and development of tamarind candy by blending with mango pulp, Journal of Pharmacognosy and Phytochemistry, Volume no: 7, Page no: 2042-2047
4. Arghya Mani et.al, Recipe standardization for preparation of Tamarind candy, The Pharma Innovation Journal, Volume no: 9, Issue: 5, ISSN: 2277- 7695; Page no: 166-170
5. Vikram, Balaji et.al,2023, *Tamarind Cultivation, Value-Added Products and Their Health Benefits: A Review*. International Journal of Plant & Soil Science, Volume no: 35, Issue: 21, ISSN 2320-7035, Page no: 903 – 911
6. K. P. Sampath Kumar et.al, 2012, Traditional and Medicinal Uses of Banana, Journal of Pharmacognosy and Phytochemistry, Volume no: 1, Issue: 3, Page no: 51-63
7. S. Jayashree, D. H. Jayasheela 2018, Standardisation, nutritional and sensory analysis of jackfruit *Halwa*, Food Science Research Journal, Volume no: 9, Issue: 1, Page no: 48-52
8. Balwinder Singh et.al, 2016, Bioactive compounds in banana and their associated health benefits – A review, Food Chemistry, Volume no: 206, Page no: 1-11
9. S. Charulatha, Dr.K.U. Pavitra Krishna, 2023, FORMULATION AND STANDARDIZATION OF TAMJACK BAR, International Journal of Creative Research Thoughts, Volume no: 11, Issue 5, ISSN: 2320-2882; Page no: 121-127
10. Dilipkumar Pal, Souvik Mukherjee 2020, Tamarind (*Tamarindus indica*) Seeds in Health and Nutrition, Nuts and Seeds in Health and Disease Prevention (Second Edition), Pages 171-182