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Evaluation of Medicinal Food Product Tamarind Spread By Sensory Analysis

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Abstract: ***Tamarind is a rich source of tartaric acid, a powerful antioxidant. Sticky pulp of tamarind contains NSP/ (Non- Starch Polysaccharides).Dietary fiber such as tannins, pectin, gums, mucilage and hemicelluloses which help to remove toxins in the body. This fruit is a rich collective source of all minerals and vitamins, which play a vital role in cardiovascular activities. The flavonoids present in tamarind useful in cancer prevention. Present study was designed to develop nutritious and energy rich tamarind spread with various formulations and to evaluate it by sensory analysis. Materials used for the development of healthy food product were, tamarind pulp, sugar, ginger, cardamom. Three different samples A, B, and C with different proportions of ingredients such as sugar 110, 120, 130 gms , Ginger 3, 2, 1 gms and cardamom 2, 3, 1gms respectively for each sample were prepared , while the quantity of tamarind pulp 200 gms was kept constant. Sensory analysis was performed for each sample by using hedonic scale. Depending on the sensory evaluation we conclude that 'C' sample was the most acceptable sample for commercial production.***

Keywords: Tamarind, hedonic scale, flavonoids, spread.

1. Introduction

Tamarind (*Tamarindusindica*) popularly known as imli is a perennial evergreen tree with a spreading crown, feathery evergreen foliage and fragment flowers. *Tamarindusindica* is one of the auspicious, versatile tree species in the Indian subcontinent. It has been used as an anti-diabetic, digestive, expectorant, anti pyretic and anti-malarial agent. Shankaracharya (1998) reported that Tamarind yields 150 to 500 kg of fruits per tree each year, with annual production in India of about 300, 000 metric tons. A mature tree is capable of producing between 175- 250 kg tamarind fruit per year. This delicious pod-like fruit is a nutritional powerhouse with an abundance of health benefits. This fruit is loaded with minerals and a vitamin required in daily diet.Tamarind fruit is hugely popular because of its health benefits and medicinal benefits. Leaves, bark, seeds, and flowers of tamarind too have medicinal uses. In this era of increased concern on safety of chemical food additives, natural methods of preservation and natural preservatives are receiving increased attention. Gupta and Prakash (2014) stated that tamarind (*Tamarindusindica*) is used in Indian spices as a souring agent to provide the desired acidity in the various food recipes.

2. Material and Method

Table 1: Ingredient used and their role in brief

Sr. No.	*Raw material used*	*Role of ingredients*
1)	Tamarind pulp	It is a main ingredient.
2)	Sugar	Sugar is used in spread and it helps to make the shelf life longer, makes the taste better and sweet.
3)	Spices	It acts as a preservative and also it acts as an antioxidant.

Equipment and Machinery used for production of tamarind spread:

1) Pulper
2) Weighing balance
3) Gas stove
4) Hand Refractometer
5) Vessel

3. Methodology

Selection of fruits:
Fresh Tamarind fruits were selected.

1) **Weighing of material**
   All the ingredients were weighed as the standard proportion.
2) **Sorting, peeling and cutting**
   Tamarinds were sorted, as well as shells were removed.
3) **Cooking**
   Tamarinds were cooked in water for 15 minutes.
4) **Cooling**
   Cooked Tamarind was allowed to cool and Extraction of pulp by pulper.
5) **Adding of sugar**
   The pulp was taken into vessel and then sugar was added to it. The mixture was cooked for 20 minutes.
6) **Addition of spices**
   Addition of cardamom and ginger powder added slowly in boiling mixture.
7) **Judging of end point**
   Cooking was done until TSS is reached up to 58-60ºBrix.
8) **Filling**
   To prevent contamination, the spread was filled into bottles in hot condition (30-40ºC).
9) **Cooling**
   The plastic bottles were cooled to prevent flavor loss.

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10) **Packaging and labeling**
The bottles are capped and labeled with the product information, including ingredients, date and location of manufacture with best before date.

11) **Storage**
The bottles were stored in cool and dry place.

4. Flow Chart

Formulation and Standardization of Product:

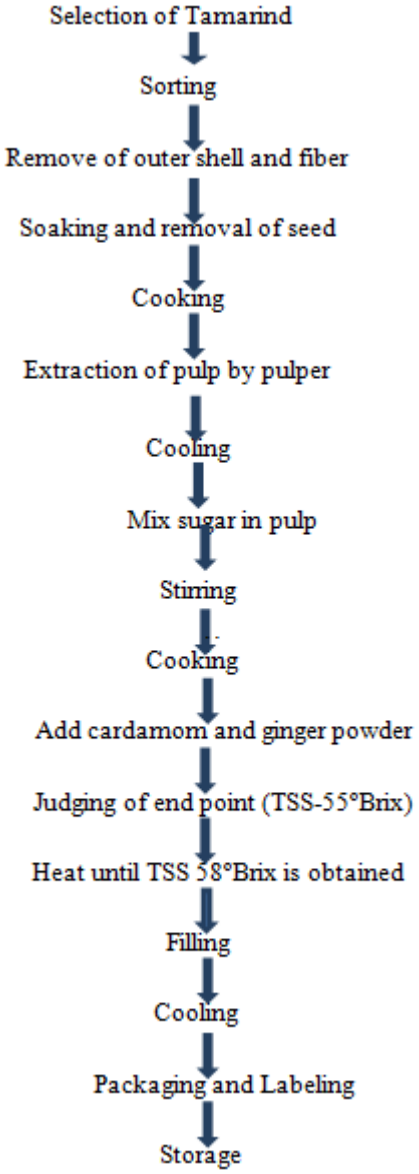

Table 2: Formulation of product

Sample	*Tamarind pulp(ml)*	*Sugar*	*Ginger powder(gm)*	*Cardamom (gm)*
A	200	110	3	2
B	200	120	2	3
C	200	130	1	1

Three different samples ABC with different proportions as described in table no.2. has been prepared and further their sensory analysis was carried out by using hedonic scale.

5. Sensory Analysis

Sensory analysis is a scientific discipline that applies principles of experimental design and statistical analysis to the use of human senses sight, smell, taste and touch for the purposes of evaluating consumer products. It requires panels of human assessors, on whom the products are tested, and recording the responses made by them. By applying statistical techniques to the results it is possible to make inferences and insights about the products under test. Most large consumer goods companies have departments dedicated to sensory analysis.

Sensory evaluation of the sample was carried out by students and staff of the department of K. K. Wagh College of food technology using nine points hedonic scale. Attributes like taste, color, texture, flavor and overall acceptability was scored based on its intensity scaled. The sensory score given by the panel have been statistically evaluated for the sensory result.

6. Results

Table 4: Average of Sensory Evaluation of study product Tamarind Spread

Sample	**A**	**B**	**C**
Color	6.9	7.2	7.3
Taste	7	7.5	7.9
Consistency	6.1	6.6	7.5
Aroma	7.3	8.7	8
Appearance	6.5	7.1	7.3
Overall acceptability	6.6	7.5	7.8

After Sensory analysis by hedonic scale Sample C was found to have highest acceptability by the entire panelist for all attributes of hedonic scale such as color, taste, consistency, aroma, appearance, Overall acceptability.

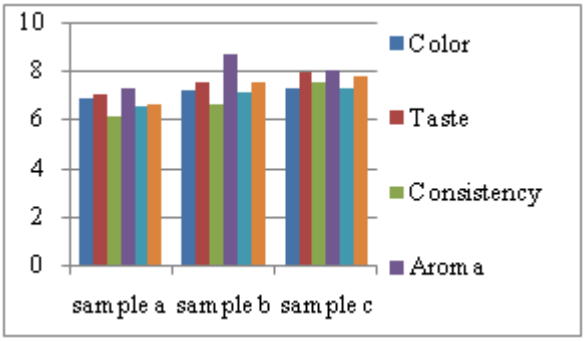

Figure 2: Graph of Sensory Evaluation

7. Discussion

There is very large market for fruit processed ready to eat food. In the modern era people are very aware about health, they select such products which are very beneficial to their health. Tamarind spread is packed with benefiting nutrients such as dietary fiber, anti-oxidants, minerals and vitamins

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which are necessary for optimum health. Tamarind are very calorie fruits, provides 115 calories per 100g. Tamarind are very good source of vitamin C and they can play a significant role in reduction of weight and blood LDL cholesterol levels. Tamarind have suggested in various traditional medicines being useful in treating colitis, chronic gallbladder disorders, arthritis, gout. The Tamarind spreads were blended in various proportions as stated in table no 2. The cardamom powder and ginger powder mix were kept in same proportion. This experiment was replicated two times and total 10 sample of spread were prepared and served to 20 semi trained panelist to judge the different sensory attributes. The samples were scored for the different attributes like color, flavor, taste, appearance and overall acceptability by using hedonic scale and its mean was calculated. The mean score obtained for the different attributes are given in table no.4

Tamarinds are nutritious and mostly eaten as fresh fruit. Tamarind can also be used in preparation of fruit juices, pie, fruits salads, juice mix with other fruits such as pineapples, peaches, grapes, etc. Tamarind can also be used in form dried pieces and also in preparation of baby foods. In view of the above, attempts were made to explore the possibility of using Tamarind fruit for the preparation of good quality spread and their market acceptability.

The value addition of fruits was done by manufacturing it into spread. Spread is prepared by boiling fruit pulp with sufficient sugar and spices to a reasonably thick consistency, firm enough to hold the fruit tissues in position. The total sugar content of spread should not be less than 60% and pH 2.9-3.5. Spread has high acidity which prevents the growth of food poisoning bacteria and also helps to maintain the colour and flavour of fruits.Processed tamarind spread was stored at ambient temperature (27°C to 34°C) as well as in refrigerator for 2 months.

Total three samples ABC with different variations were prepared and Sample C was found to have highest acceptability, thus tamarind the principle ingredient of study product tamarind spread has medicinal value with following health benefits and hence suggested as a natural medicinal food product.

Health Benefits of Tamarind

Tamarind has the ability to lower levels of bad cholesterol (LDL) thereby promoting healthy cardiovascular health, this because of the presence of phenols, antioxidants beneficial for levels of HDL. Diluted tamarind paste is an excellent home remedy for sore throat. A person with throat infection can gargle diluted lukewarm tamarind water for relief. Tamarind pulp with a mix of crushed herbs such as coriander and mint is an excellent treatment for mouth ulcers. Tamarind has a cooling effect on ulcers caused by hot and spicy foods. This fruit pod is loaded with minerals and vitamins essential for red blood cell production and healthy cardiovascular function. Scoops of thick tamarind paste are diluted in water and given to individuals with intestinal parasites. Tamarind is an excellent home remedy for persons with bile problems. In Ayurvedic medicine, Tamarind is a major ingredient used to treat digestive and gastric problems. Tamarind fruit is rich in dietary fiber such as tannins, mucilage and pectin, a combination that plays a vital role in preventing constipation. 13% to 15% percent dietary fiber is provided by 100 grams of tamarind paste. Pulp of tamarind is known to protect against Vitamin C deficiency. Tamarind juice is used as a traditional medicine for jaundice sufferers. This fruit has powerful antioxidants that protect against harmful chemicals that cause cancer. Minerals present in tamarind are good for bone health. Thus this study introduces the natural product with lots of medicinal values and health benefits.

8. Conclusion

From the sensory evaluation results we conclude that sample 'C' was the most acceptable sample for chemical analysis and large scale commercial production. And tamarind can be a good option for the preparation of spread.

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