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Formulation of flavoured sweet and spicy tamarind sauce

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Abstract
Tamarind is abundantly available in the North-Eastern states of India, particularly Manipur. However, the major mode of consumption is as it is. The study aimed to utilise the locally available tamarind fruit in preparation of sweet and spicy sauce. The developed sauce was standardised using varying concentration of ingredients. The standardised recipe was subjected to sensory evaluation by 25 semi-trained panel members to assess the most accepted trial. Recipe trial no. 3, containing 70 g sugar, 1 teaspoon of red chilli powder and 1 tbsp. corn starch was found to be the most desirable one in terms of flavour, consistency and appearance.

Keywords: Tamarind, sauce, standardisation, sensory evaluation

Introduction
Tamarind (*Tamarindus indica*) is a leguminous tree (family fabaceae) bearing edible fruit that is indigenous to tropical Africa. The genus Tamarindus is monotypic, meaning that it contains only this species. The tamarind tree produces pod-like fruit that contains a brown, edible pulp used in cuisines around the world. The fruit has a fleshy, juicy, acidic pulp. It is mature when the flesh is coloured brown or reddish brown. The hard green pulp of a young fruit is considered to be too sour by many, but is often used as a component of savoury dishes, as a pickling agent or as a means of making certain poisonous yams in Ghana safe for consumption. As the fruit matures it becomes sweeter and less sour (acidic) and the ripened fruit is considered more palatable. The sourness varies between the cultivars and some sweet tamarinds have almost no acidity when ripe. The tamarinds of Asia has longer pods (containing six to twelve seeds), whereas the African and west Indian varieties have shorter pods (containing one to six seeds). The seeds are somewhat flattened, and a glossy brown. The fruit is best describe as sweet and sour in taste, and is high in tartaric acid, sugar, B vitamins, and unusually for a fruit, calcium. The fruit is harvested by pulling the pod from its stalk. The pulp is also used in traditional medicine and as a metal polish. The tree's wood can be used for wood working and tamarind seed oil can be extracted from the seeds. Tamarind's tender young leaves are used in the Indian cuisine. Because tamarind has multiple uses, it is cultivated around the world in tropical and sub-tropical zones.
As stated by Saideswara *et al*., (2012) [7], the Tamarind fruit was at first thought to be produced by an Indian palm, as the name tamarind comes from a Persian word 'tamar-i-hind', meaning 'date of India'. Its name 'amlika' in Sanskrit indicates its ancient presence in the country. It was mentioned in the Indian Brahmasamhita scriptures between 1200 and 200 BC. The tamarind tree is now considered to have originated in Madagascar. It is thought to have been introduced to South and Southeast Asia and to have become naturalized in many areas to which it was introduced. It is now cultivated throughout semi-arid Africa and South Asia and has been planted extensively in Bangladesh, India, Myanmar, Malaysia, Sri Lanka, Thailand and several African, Australian, Central American and South American countries.
Tamarind paste has many culinary uses including flavouring for chutneys, curries, and the traditional sherbet syrup drink. Tamarind sweet chutney is popular in India and Pakistan as a dressing for many snacks. Tamarind pulp is a key ingredient in flavouring curries and rice in south Indian cuisine, in the Chigalli lollipop, and in certain varieties of masala chai tea.
Across the Middle East from Levant to Iran, tamarind is used in savoury dishes, notably meat based stews, and often combined with dried fruits to achieve a sweet – sour tang. In the Philippines, the whole fruit is added to a dish called sinigang to add a unique sour taste, unlike that of the dishes that use vinegar instead.

The tamarind is compose of carbohydrate – 62.5 g of which 57.4 g is sugar and dietary fibre 5.1 g, fat – 0.6 g, protein – 2.8 g, minerals (calcium – 74 mg, copper – 0.86 mg, iron – 2.8 mg, magnesium – 92 mg, phosphorous – 113 mg, potassium – 628 mg, selenium – 1.3 µg, sodium- 28 mg, zinc – 0.1 mg) per 100 g edible portion.

Tamarind is available in Manipur but mostly consumed as it is either due to lack of processing knowledge or incorporation in the regular consumption. This leads to the wastage of the tamarind available during the season. In this study, the locally available tamarind will be prepared into a sweet and spicy sauce with a minty flavour and standardised using different levels of the ingredients concentration. The standardisation is to find out which recipe gives the most desirable sensory outcome. The sweet and spicy tamarind sauce with added mint extract will give a fresh twist to the traditionally available tamarind sauce in different parts of India in terms of flavour and enhanced nutritional value. This study will enable to explore the scope in which it can be use larger scale of production for the income generation. Hence, the project is formulated the objectives to formulate mint flavour a sweet and spicy tamarind sauce and to standardise a recipe for the prepared sweet and spicy tamarind sauce.

Materials and Methods

Formulation of tamarind sauce

The tamarind sauce was formulated using tamarind, salt, sugar, cumin seeds, coriander, red chilli, corn flour and mint.

Preparation of the tamarind pulp

Ripe tamarind was soaked in water overnight. Once the tamarind pulp absorb enough water and swelled up, it formed a thick and smooth consistency. The seeds, undesirable fibres and hard pulp was removed and sieved to obtain a smooth and uniform consistency.

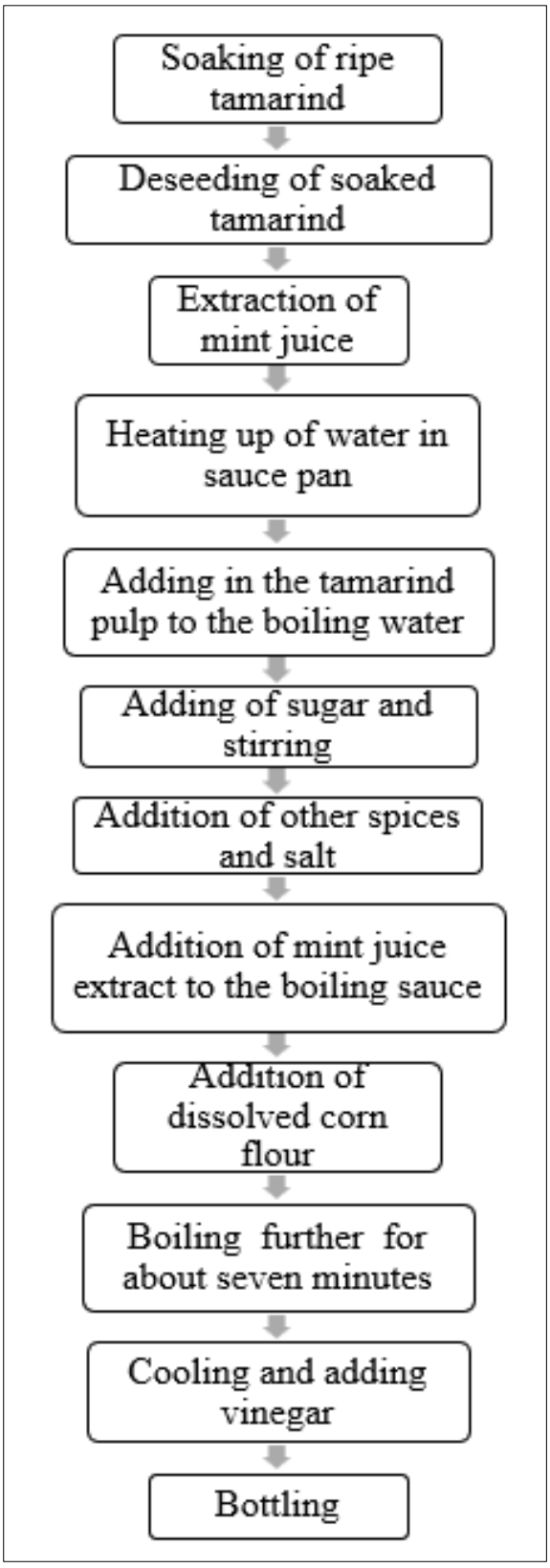
Preparation of mint extract

Fresh mint leaves was washed and pad dry using kitchen towel to remove excess moisture. The leaves were grounded to a fine paste with the addition of water. The pulp was strained using a muslin cloth and taken out the mint extract.

Preparation of Standard tamarind sauce

Procedure of preparation of sauce

The standard tamarind sauce was prepared using tamarind with mint extract (from 50 g mint), ground cumin, ground coriander, black pepper and salt. Tamarind was soaked overnight using 250 ml of water. The pulp was prepared as in 2.1.1. In a heated pan the tamarind pulp was added with a small amount of water and stirred to combine well. The sugar was added and stirred until dissolved. After the sugar has been dissolved, other ingredients and spices (salt, ground cumin seeds, ground coriander, and red chilli powder) was added with continuous stirring. After a minute or two, the mint extract was added and continue heating for two more minutes. Corn flour dissolved in 10 ml of cold water was added to the boiling sauce. The sauce was boiled and stirred continuously for about seven minutes or till a thick consistency was obtained. After the sauce was cooled down to room temperature, 5 ml of vinegar was added enhance the shelf-life.



Flow chart 1: Diagram of sweet and spicy tamarind sauce preparation

2.1.6 Preparation of sweet and spicy tamarind sauce

The sweet and spicy tamarind sauce was standardised by using three trials with different concentrations of sugar, corn starch and red chilli powder. The different proportion of ingredients used are as follows.

Table 1: Different proportion of ingredients used

Sl. No.	Ingredients	Amounts		
		Trial 1	Trial 2	Trial 3
1.	Tamarind	100 g	100 g	100 g
2.	Mint extract	50 ml	50 ml	50 ml
3.	Cumin powder	½ teaspoon	½ teaspoon	½ teaspoon
4.	Coriander powder	½ teaspoon	½ teaspoon	½ teaspoon
5.	Black pepper powder	¼ teaspoon	¼ teaspoon	¼ teaspoon
6.	Salt	1 teaspoon	1 teaspoon	1 teaspoon
7.	Water for soaking tamarind	250 ml	250 ml	250 ml
8.	Water for boiling sauce	250 ml	250 ml	250 ml
9.	Sugar	50g	100 g	70 g
10.	Red chilli powder	½ teaspoon	1 ½ teaspoon	1 teaspoon
11.	Corn starch	1 teaspoon	2 teaspoon	1 tablespoon

Sensory analysis of the products

The sensory analysis of the products was done by 25 semi-untrained panel members on a 9 point hedonic scale to check the consumer acceptability in order to draw a conclusion of which of the three trial was most acceptable in terms of flavour, consistency and appearance.

Results and Discussion

Sensory analysis of the three recipes: Trial No. 1, Trial No.1 and Trial No. 3 was done by a 25 semi-untrained panel members on a 9 point hedonic scale with consistency, sweetness, spiciness, colour and overall flavour being the parameters of evaluation.

Table 2: Observation of tamarind sauce

Trial No.	Observation				
	Consistency	Sweetness	Spiciness	Colour	Overall flavour
1.	Slightly runny	Not very prominent	Not very prominent	Dark brown	Minty
2.	Slightly runny	Too prominent	Very spicy	Reddish dark brown	Minty
3.	Not to runny nor too thick	Not too sweet	Not too spicy	Dark brown	Minty

From the above table, it can be observed that, in terms of consistency, Trial No.1 and 2 was slightly runny while Trial No. 3 was not to runny nor too thick.

The Sweetness of Trial No. 1 was not very prominent while Trial No. 2 was too prominent and Trial No. 3 was not too sweet.

Product of Trial No. 1 was not very spicy while Trial No. 2 was very spicy and Trail No. 3 was neither.

The colour of the products of Trial No. 1, 2 and 3 was dark brown, reddish dark brown, and dark brown respectively.

All of the three products had the same level of a minty flavour.

Table 3: Sensory evaluation score of Trial No. 1 sweet and spicy tamarind sauce on 9 point hedonic scale

Score	No. of panels agreeing to the scores of each of the following parameters					
	Colour	Appearance	Texture/ consistency	Flavor/ aroma	Taste	Overall acceptability
(9) Like extremely						
(8) Like very much			3	3	3	
(7) Like moderately			3	3	5	
(6) Like slightly	4	3	7	5	6	3
(5) Neither like nor dislike	5	5	8	6	4	5
(4) Dislike slightly	9	8	7	5	5	8
(3) Dislike moderately	5	6	3	3	2	6
(2) Dislike very much	2	3				3
(1) Dislike extremely						

From the above table, it can be observed of the product of Trial No. 1 that, out of the 25 panel member's, majority of the panels slightly disliked the colour, appearance and overall acceptability. While a majority of the panels neither liked nor disliked the consistency and flavour of the sauce.

Table 4: Sensory evaluation score of Trial No. 2 sweet and spicy tamarind sauce on 9 point hedonic scale

Score	No. of panels agreeing to the scores of each of the following parameters					
	Colour	Appearance	Texture/ consistency	Flavor/ aroma	Taste	Overall acceptability
(9) Like extremely						
(8) Like very much	4	3	7			
(7) Like moderately	5	5	8		3	3
(6) Like slightly	9	8	7	3	4	5
(5) Neither like nor dislike	5	6	3	3	6	8
(4) Dislike slightly	2	3		5	8	6
(3) Dislike moderately				6	3	3
(2) Dislike very much				5	1	
(1) Dislike extremely				3		

Table 5 shows that majority of the panels slightly liked the colour and appearance of the product of Trial No. 2. The flavour of the product was disliked moderately by 6 panels out of 25. A total of 8 panels liked the taste moderately and majority of the panels neither liked nor disliked the overall acceptability.

Table 5: Sensory evaluation score of Trial No. 3 sweet and spicy tamarind sauce on 9 point hedonic scale

Score	No. of panels agreeing to the scores of each of the following parameters					
	Colour	Appearance	Texture/ consistency	Flavor/ aroma	Taste	Overall acceptability
(9) Like extremely				8	7	7
(8) Like very much	9	8	9	7	5	8
(7) Like moderately	5	6	5	7	6	4
(6) Like slightly	4	5	5	3	2	6
(5) Neither like nor dislike	5	3	3		5	
(4) Dislike slightly	2	3	3			
(3) Dislike moderately						
(2) Dislike very much						
(1) Dislike extremely						

From the above table, it can be observed that, a majority of the panels liked the product extremely in terms of flavour and taste. In terms of colour, appearance and texture, most of the panels liked the product very much.

Conclusion

Because of the use of tamarind by people in their cuisines at large, it can be further processed to increase its consumption, variety and consumer acceptability even to people who doesn't have the idea of incorporating further in the consumption. Processing the tamarind fruit can increase its shelf life as well. Tamarind sauce is widely used in the foods of the Indian people mainly of the south. However, the consumption of tamarind fruit and its processed products in Northeast India is relatively less. Since tamarind is mostly eaten as it is the consumption and utilisation is low. Processing of the tamarind fruit into sauce is one such way to increase the utilization and acceptability by the people which can be used in many ways as a dipping sauce for snacks and flavouring condiment. In regards to this view, the formulated and standardised mint flavoured sweet and spicy tamarind sauce have been found to have a good overall flavour profile and the added mint extract gave the product a fresh twist even more.

References

1. Joshi A, Kshirsagar RB. Preparation and quality evaluation of sauce and squeezy from tamarind, variety Ajanta. J Food Process Technol. 2012 Nov 24;3(10):139.
2. Singh DK, Wangchu L, Moond SK. Processed products of tamarind. Nat Prod Radiance. 2007;6(4):315-321.
3. Masette M, Candia A, Ocheng AG. The commercial viability of Tamarind (*Tamarindus indica* L.) fruit based products for improved incomes among farmers in Northern and Eastern Uganda. Afr. J Food Sci. Technol. 2015;6(6):167-176.
4. Mikaili P, Mojaverrostami S, Moloudizargari M, Aghajanshakeri S. Pharmacological and therapeutic effects of *Mentha Longifolia* L. and its main constituent, menthol. Anc Sci Life. 2013 Oct;33(2):131-138.
5. Abdi SM, Atsangoserrem C. Process development, Nutrient and Sensory qualities of Hot and sweet sauce with tamarind (*Tamarindus indica* L.). Afr. J Educ. Sci. Technol. 2013 Sep-Oct;1(1):88-99.
6. Bhadoriya SS, Ganeshpurkar A, Narwaria J, Rai G, Jain AP. *Tamarindus indica*: Extent of explored potential. Pharmacogn Rev. 2011 Jan;5(9):73-81.
7. Saideswara RY, Mary MK. Tamarind. In: Peter KV, ed. Handbook of Herbs and Spices. 1st ed. Woodhead Publishing Limited; c2012. p. 512-533.
8. Tamarind. Wikipedia. Available from: https://en.wikipedia.org/wiki/Tamarind. Accessed June 26, 2020.

Appendix

Image showing trial 1 of Sweet and Spicy Tamarind Sauce that has thin consistency

Image showing trial 2 of Sweet and Spicy Tamarind Sauce

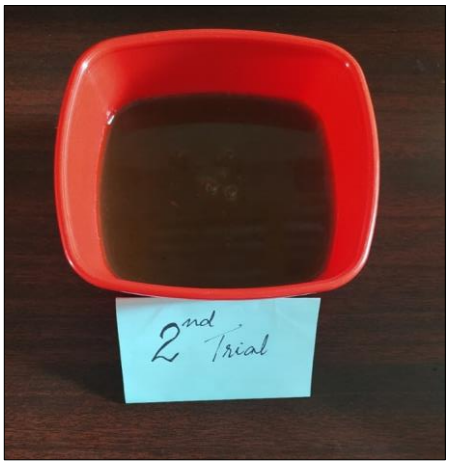


Image showing trial 3 of Sweet and Spicy Tamarind Sauce

with thicker consistency