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RESEARCH ARTICLE

COMPARAITIVE EVALUATION OF PHYSICO-CHEMICAL CHARACTERISTICS OF THREE DIFFERENT VARIETIES OF TAMARIND (AJANTA, THAILAND AND LOCAL)

***,[1]Joshi, A. A., [2]Kshirsagar, R. B. and [3]Chilkawar, P. M**

[1]S.R.A. Department of Food Chemistry and Nutrition, College of Food Technology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

[2]Department of Food Engineering, College of Food Technology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

[3]S.R.A. Naigaon College of Food Technology, Nanded, -431402, India

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ABSTRACT

The experiment was conducted to study the physico-chemical characteristics of Ajanta and Thailand varieties of tamarind and the results obtained were compared with the local variety. It showed that Thailand variety was superior in physical characteristics like length and width where as Ajanta was superior in respect of average fruit weight, per cent flesh and average pulp yield, while the local variety was found to be at par in these respect. Thailand variety was rich in carbohydrates, reducing and total sugars with lowest extractable TSS and minerals. However the local tamarind variety pulp was having highest TSS, ascorbic acid and minerals (calcium and iron) as compared to other two varieties. On the other hand Ajanta variety was rich in protein and fat content with at second most position in extractable TSS, ascorbic acid and minerals.

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INTRODUCTION

Tamarind (*Tamarindus indica)* also called Indian date due to the date-like appearance of the dried pulp belongs to family *Leguminoceae.* It is having hardy nature, ability to produce good yield under rain fed conditions and a high potential in export. In spite of being a useful tree with an adaptable nature, multifarious uses and potential source of foreign earner, it is ironically quite a neglected crop. Lack of named or standard varieties, comparatively long juvenile period and alternate bearing habit are the main constrains in making this crop popular on orchard scale (Keskar *et al*., 1989). However, area under tamarind is very limited hence; it is considered to be minor fruit. Medicinal uses of tamarind are uncountable. Tamarind pulp is used to allay thirst and is nutritive and refrigerant; in large quantity, laxative. On this account it forms a useful and agreeable drink in *febrile* and *inflammatory diseases*; and with persons recovering from sickness, to keep their bowels regular, it may form a portion of their diet. A convenient cooling laxative is tamarind-whey, made by boiling 1ounce of the pulp in 1 pint of milk, and straining the product. The pulp has been official in the British and American and most other pharmaceuticals. Tamarind preparations are universally recognized as refrigerants in fevers and as laxatives and carminatives. Alone, or in combination with lime juice, honey, milk, dates, spices or camphor, the pulp is considered as a digestives', even for elephants, and as a remedy for biliousness and bile disorders. In native practice, the pulp is applied on inflammations, and is used in a gargle for rheumatism. It is further, administered to alleviate sunstroke, Datura poisoning, and alcoholic intoxication. In Southeast Asia, the fruit is prescribed to counteract the ill effects of overdoses of false chaulmoogra, *Hydnocarpus anthelminitica* Pierre, given in leprosy. The pulp is said to aid the restoration of sensation in cases of paralysis. Though every part of tamarind fruit is useful, the fruit is the most valued and widely used in the orient in foods, beverages and medicines. Like other horticultural crops, the tamarind fruits are also utilized to prepare products of commercial importance. Due to massive production of fruits, this has provided opportunity for processing industries to have abundant raw material for processing. Excellent flavor, nutritive value and medicinal characteristics of fruit indicate its good potentiality for processing in to value added products having extended shelf life, processing into value added products is one of way of preservation of this commodities and improving its utilization for human health. Looking to the fast increasing area under tamarind cultivation and also considering its therapeutical properties there is an urgent need to develop the processing technology of this perishable fruit into different commercial value added products having extended shelf life. However sourness and high acidic nature of tamarind pulp restricts its use for table purpose and also for value addition. The investigation under presentation and efforts towards this vein was taken to study the physico-chemical characteristics of different varieties of tamarind i.e. Ajanta (sweet and sour), Thailand (sweet) and comparison with local variety (sour). An attempt has also been made to prove the suitability of these selected varieties for preparation of different commercial value added products.

Corresponding author: A.A. Joshi
SRA Department of Food Chemistry and Nutrition, College of Food Technology, Marathwada Agricultural University, Parbhani, India.

MATERIALS AND METHODS

The fresh, mature tamarind fruits of Ajanta variety were procured from Fruit Research Station, Aurangabad. Thailand variety tamarind was procured from MPKV Rahuri.

Table 1. Physical characteristic of tamarind fruit

Variety	Parameters								
	Color	Length (cm)	Width (cm)	Average Weight (g)	Flesh (%)	Seed (%)	Shell and rag (%)	Pulp yield (%)	Waste (%)
Ajanta	Dark brown	10.1	2.5	18.5	55.4	24.3	18.8	80.0	6.82
Thailand	Light brown	12.2	4.1	17.9	43.3	35.7	29.3	58.7	9.8
Local	Reddish brown	10.38	3.23	16.3	44.80	23.8	25.4	51.8	11.7
S.E.	-	0.60	0.15	0.43	1.299	1.09	0.67	0.56	0.44
C.D.at 5%	-	NS	0.47	1.34	3.99	3.38	2.08	1.73	1.35

Table 2. Chemical characteristics of tamarind fruit flesh

Variety	Parameters (%)					
	Moisture	Carbohydrate	Protein	Fat	Ash	Fiber
Ajanta	4.6	70.9	3.9	0.2	4.6	4.3
Thailand	4.9	72.6	3.1	0.01	4.2	4.7
Local	10.6	63.4	3.4	0.1	3.9	5.3
S.E.	0.158	0.625	0.061	0.023	0.115	0.132
C.D.at 5%	0.486	1.92	0.188	0.0709	0.355	0.409

Table 3. Chemical composition of tamarind pulp

Parameters	Variety			S.E.	CD at 5 %
	Ajanta	Thailand	Local		
TSS (^{0}Brix)	27	26	31	0.336	1.034
pH	2.6	4.2	1.9	0.125	0.385
Acidity (%)	1.5	0.9	3.3	0.046	0.144
Tartaricacid (%)	1.8	1.1	3.92	0.090	0.2783
Reducing Sugar (%)	17.7	17.7	16.6	0.344	1.059
Total Sugar (%)	38.8	43.8	34.6	0.514	1.584
Ascorbic acid (%)	3.9	3.0	5.4	0.179	0.552
Calcium (mg)	368	141	402	1.82	5.61
Iron (mg)	1.53	0.9	1.42	0.0233	0.0717

RESULTS AND DISCUSSION

Physical characteristics

The data on physical characteristics of tamarind of different varieties presented in tableI revealed that in physical characteristics among the three different varieties compared, Ajanta variety with highest fruit weight, flesh percentage and highest pulp yield was found to be significantly superior over Thailand and local tamarind variety. However Thailand variety was also found significantly superior over Ajanta and local tamarind with respect to width and per cent of seed. Ajanta variety was found to be significantly superior in the desirable characteristics like flesh, pulp yield, and waste over Thailand and local variety which proves its suitability for processing. Lewis *et al*., (1954) and Bueso, (1980) reported the similar results on the physical characteristics regarding an average length, width, weight, flesh, waste and pulp yield of tamarind. Anonymous, (1976) also found similar results during the study. The tamarind pod is composed of shell 15-25 per cent, pulp 45-55 per cent, seeds 25-35 per cent and fiber 10-15 per cent (Shankaracharya, 1998). Kotecha, (2002) *et al*., described the physical characteristics of tamarind fruits of Local, Pratishthan and Number 263 variety with fruit length, width and girth were ranged from 9.94 to 11.35, 3.11 to 3.72 and 6.22 to 7.44 cm respectively.

Chemical characteristics

The data presented in Table II reveals that Ajanta variety was found to be significantly superior in carbohydrates, protein and fiber content over local variety while it was significantly at par with Thailand in carbohydrates and fiber content. There was not much statistical difference observed in fat and ash content among three varieties of tamarind. The highest content of protein, fat, ash and lowest moisture, and fiber content of Ajanta variety was useful to prepare nutritionally rich good quality commercial value added products. Lewis and Neelkanthan (1964) also coated the similar results as tamarind pulp containing 3 per cent crude protein (Nx6.25). Roy and Joshi, (1995) also reported the similar results as ripe tamarind pulp contains water 22.6-69.2 per cent, protein 1.4-3.3 per cent, carbohydrates 59.7-71.8 per cent. The edible pulp of tamarind fruit is relatively poor in protein and oil but the seed is a good source of both protein and oil (Ishola *et al*., 1990).

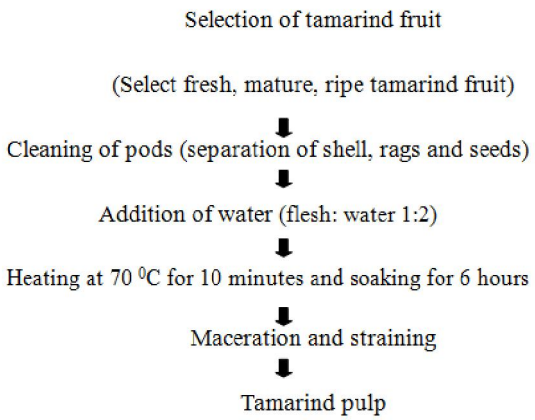

Figure 1. Preparation of tamarind Pulp

Chemical composition of tamarind pulp

The data given in table III shows that among the chemical properties of tamarind varieties under study the Thailand variety was rich in carbohydrates, reducing and total sugars with lowest extractable TSS and minerals. However the local tamarind variety pulp was having highest TSS, ascorbic acid and minerals (calcium and iron) as compared to other two varieties on the other hand Ajanta variety was rich in protein and fat content with at second most position in extractable TSS, ascorbic acid and minerals. The values of reducing and total sugars are in agreement with the reported values.of Duke (1981) and Ishola *et al*., (1990). The values of ascorbic acid content of the pulp are in agreement with the reported values of (Kotecha, *et al*., 2002). Bhattacharya *et al*. (1993) and Ishola *et al*. (1990) reported the similar results regarding calcium and iron content of

fresh pulp. In the present investigation the values of tartaric acid and titratable acidity were on lower side than the values reported in the literature.

Conclusion

Tamarind variety Ajanta with higher yield and superior physicochemical qualities could be well utilized for preparation of various value added products.

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