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A Review

Medico-nutritionally enriched fruit-Tamarind

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ABSTRACT

The name tamarind is derived from the Arabic word 'Tamar-u'l-Hind' because the dark brown pulp of the fruit was thought to resemble dried dates. It was therefore called the Tamere-hindi or 'date of India. Tamarind is a valued mostly for its fruit and pulp, which is used for a wide variety of domestic and industrial purposes. Tamarind is not a desert fruit, although the sweet tamarind is often eaten fresh directly from the pods. This is usually removed from the pod and used to prepare juice, jam, syrup, candy and pickles. The acidic pulp is used as a favourite ingredient in culinary preparations such as curries, chutney , sauces, ice cream and sherbet in countries, where the grows naturally. The leaves are an important source of food and herbal medicine and the edible pulp of ripe fruits is used as a flavouring agent in cooking, soups, jams, chutneys, sauces, pickles etc. The fruit pulp of tamarind forms the "Tamarind of Commerce". This suggests that tamarind seed coat, a by-product of the tamarind gum industry, could be used as a safe and low cost source of antioxidant. Tropical fruit tree are important crops which supplement and improve the quality of diet. Many of the species have multi-purpose uses in that they produce non food products such as fuel, timber, fodder, medicines and industrial products for small holders. Harvesting from these trees enable rural people to provide nutrition for a balanced diet and generate income thus alleviate poverty.

Key words: Enriched fruit, Industrial use, Medicinal uses, Nutritional fruit.

INTRODUCTION

India is the world's largest producer of tamarind products. It is particularly abundant in the India states of Madhya Pradesh, Bihar, Andhra Pradesh, Karnataka, Tamil Nadu and West Bengal. The production in India is mainly concentrated in the drier southern states and the produce is collected by the villagers and sold in the market. In India, the average production of tamarind pods per tree is 175 kg and processed pulp is 70 kg/tree (Kulkarni *et al.,* 1993). Tamarind (*Tamarindus indica L*) can be found throughout much of the tropics; it is grown unattended in backyards, roadsides or waste lands. Tamarind is ideally suited for avenue plantings as a roadsides tree, in and around villages as a multipurpose species for agro-forestry system or as protective firebreaks for forest margins. It is a valuable timber species widely used for making furniture, tool handles, charcoal, oil mills, rice pounders and fuel wood. The leaves are an important source of food and herbal medicine and the edible pulp of ripe fruits is used as a flavouring agent in cooking, soups, jams, chutneys, sauces, pickles etc. The fruit pulp of tamarind forms the "*Tamarind of Commerce*".

NUTRITIONAL PROPERTIES

Tamarind is a nutritious fruit with a variety of uses. Tamarind has many valuable properties and virtually every part of the tree has been utilized by both rural and urban dwellers. The most valuable and commonly used part of the tamarind tree is the fruit. The pulp constitutes 30-50 % of the ripe fruit, the shell and fibre account for 11-30% and seed about 25-40 %. Fruit compositions are variable, depending on locality (Table 1). The compare in the proximate composition and food energy vale of ripe tamarind by different scientist is shown in Table 2.

Tamarind has low water content and a high level of protein, carbohydrates (60-72 %) and minerals. The soluble solids content varies from 54-69.9 ^{0}Brix ((Benero *et al.,* 1974). Ishola *et al*., (1990) reported that of Nigerian tamarind is poor in protein (87.9 g/kg) and oil (25.3 g/kg). The pulp contains oil, which is greenish in colour and liquid at room temperature. The saponification value of the oil is high but the iodine value is low. The physico-chemical properties of the pulp and seed are shown in Table 3.

The major volatiles constituents of tamarind pulp include furan derivatives (44.4 %) and carboxylic acid (38.2%). The components of which are furfural (38.2%), palmitic acid (14.8%), oleic acid (8.1 %) and phenyl acetaldehyde (7.5%) by Wong *et al.,* (1998). According to Lee *et al.,* (1975) the most abundant volatiles constitutes of tamarind is 2-acetal-furan, coupled with traces of furfural and 5-methyl furfural,

Table 1: Average composition of tamarind fruit (Gunasena and Hughes, 2000)

Constituents	Amount (per 100 g)
Water	17.8-35.8 g
Protein	2.0-3.0 g
Fat	0.6 g
Carbohydrates	41.1-61.4 g
Fibre	2.9 g
Ash	2.6-3.9 g
Calcium	34.0-94.0 mg
Phosphorus	34.0-78.0 mg
Iron	0.2 – 0.9 mg
Thiamine	0.33 mg
Riboflavin	0.1 mg
Niacin	1.0 mg
Vitamin C	44.0 mg

which form the total aroma of tamarind. The colour of the red type is due to water soluble red rose anthocyanin pigments, while in the common type leuco-cyanidin is present (Bhattacharyya, 1974). According to Lakshinarayan Rao *et al.,* (1954) about 55 % of the total nitrogen in the tamarind pulp was non protein or soluble in 10% trichloroacetic acid, and 70% of this contributed by free amino acid. The several free amino acids were identified in the tamarind pulp: proline, serine, â-alanine, phenylanine and leucine. These amino acids were present higher quantities in the ripe fruit than in immature fruits, indicating the accumulation of free amino acids during the maturation and ripening of tamarind. In general, the dried tamarind pulp of commerce contains 8-18 % tartaric acid (as potassium bitartarate) and 25-45 % reducing sugars of which 70 % in glucose and 30 % fructose (Table 4).

Lewis and Neelakantan (1964a) reported that one of half of the tartaric acid was present as potassium bitartartrate. The tender fruit contain most of the tartaric acid in free form (upto 16 %), which can be easily extracted with hot water. Lewis *et al.,* (1961) also reported that tartaric acid is present at all stages of fruit development as an optically active (+) isomer. The most commonly found isomer in fruit is malic acid; about 1.37 mg/l existed as the (-) form in tamarind fruits.

Tamarind pulp is also rich in minerals, high in potassium (62-570

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