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Exploring the nutritional potential of Timru: A dry-land fruit

Timru, a minor forest produce, is endemic to the central India. It is found growing in abundance all over the central parts of India. Commercially, its leaves are used for making bidi, a traditional cigarette. However, most of its produce goes waste since its fruit has never been explored for its nutritional values whereas its fruits are rich in sugars, vitamin C and β-carotene. In addition to this, fruit pulp is also rich in nutrients such as potassium (285.17-304.85 mg/100 g), calcium (375.23-395.35 mg/100/g) and phosphorus (153.40-160.52 mg/100 g). Thus, it is an ideal indigenous fruit for processing into health promoting products like nectar, jam, toffee and squash.

TIMRU or *tendu* (*Diospyros melanoxylon* Roxb.), belonging to the family Ebenaceae, is native to India and Sri Lanka. It is endemic to semi-arid dry-land areas of Gujarat, Madhya Pradesh and Rajasthan. A long-lived, deciduous and drought hardy tree, it bear berry sized fruits. Hitherto, its leaves mainly are used for making *bidi* while ripe fruits are consumed by local inhabitants only. Timru fruit has high total phenolic content, flavonoids, antioxidants and β–carotene content. The extracts of bark are used as ethno-medicine to treat dyspepsia, diarrhea, and smallpox. The local tribes use it as fresh fruit, pulp, powder and fruit wine. The fruits are available mainly during April-June. The harvested fruits are consumed fresh in the season while dried and stored ones are used in off-season. Fruits are round in shape with 3-4 cm diameter and its fruit weighs around 18-28 g. It contains 1-3 seeds of brown colour, compressed and oblong in shape. Leaves are used in the treatment of scabies and old wounds, and as laxative and carminative medicine. Fruit, a rich source of tannin is used in stomach ailments. The dried fruit powder is used as carminative and astringent agent and is useful in treating urinary and skin related disorders. However, due to lack of awareness regarding nutritional significance of timru fruits, most of the fruits are not utilized in economical way. Therefore, to ascertain the physico-chemical diversity in the fruits, a systematic survey of endemic areas of Panchmahal, Chhotaudepur and Dahod districts of Gujarat was made so that people could be made aware about its nutritional properties.

Timru tree: Prime source of nutrition in tribal areas

Tree

The tree is deciduous in semi-arid hot dry-land areas of central India during hot summer months for a short period of time in March-April and starts new

Harvested fruits of timru: A rich source of β-carotene

growth flushes in May-June. It is a medium-sized tree or shrub growing up to 25 m, and 1.9 m girth. The bark is pelican in colour and exfoliating in rectangular scales. It has extensive tap root system. Leaves are opposite or alternate, coriaceus, up to 35 cm long. Young leaves are tomentose on both sides while fully grown leaves are glabrous above. Flowering occurs during February-April, bears 3 types of flowers i.e. pistilate, staminate and perfect, however, sometimes dioeceous condition do exists. Male flowers are mauve in colour, appears axillary in clusters of 3-4 flowers. Female flower are mostly cauliflorous or sometimes solitary, larger than male flowers, can be identified by presence of four lobbed large dark green calyx. The hermaphrodite flowers are intermediate in size and occasionally found in the cluster of male flowers. Immature fruits are olive green, ovoid or globose and yellow to light orange when ripe during May-June.

Nutritive value

There is wide variation in fruit weight (18.43-28.72 g), length (3.15-3.55 cm), width (3.35-3.58 cm), pulp (53.48-58.89%), seed weight (1.11-2.29 g), length (17.28-21.81 mm), diameter (10.16-13.05 mm) and thickness (1.17-1.75 mm). There is variation in acidity (0.12-0.26%), TSS (19.23-23.57 °Brix), vitamin C (19.90 -27.40 mg/100 g), total sugars (28.15-30.19%), carotene (410.05-420.08 µg/100 g FW), potassium (285.17-304.85 mg/100 g), calcium (375.23-395.35 mg/100 g) and phosphorus (153.40-160.52 mg/100 g) in its fruit. Variations in physico-chemical and mineral contents suggest its possibility for fresh consumption and industrial processing.

Possibility of value-addition and poverty alleviation

Since timru fruits are rich source of carbohydrates, calcium, phosphorus, and carotene, they can prevent malnutrition in tribes of central India. Generally, powder of its dried fruits is used as aroma agent while dried flowers are used for treating urinary and skin related disorders. Since its fruits are highly perishable in nature, they are wasted due to lack of industrial processing. Therefore, in order to improve socio-economic conditions of tribals, timru fruits need to be processed into various value-added products. Fruits being rich in sugar can be used for making nectar, jam, toffee, powder and wine.

Propagation

Timru is a highly heterozygous, cross-pollinated fruit plant and predominantly propagated by seeds which gives immense opportunity to select elite trees having desirable horticultural traits. Ideal time for multiplication is June-July through seeds after the onset of monsoon. However, it can also be multiplied through patch budding on 6-9 old seedling rootstocks in the month of January-March. For improved seed germination, a mixture of FYM, soil and sand in the ratio of 3:2:1 should be used in the nursery beds and polythene bags. After seed sowing, nursery beds are covered with paddy straw and irrigated at regular interval for enhanced seed germination.

Harvested seeds of timru

Production technology

It can be grown on a variety of soils including lateritic, black soil and rocky soils as well. It grows on poor denuded soils, hot and dry hill slopes, stony soils with quartzite, shale and sandstone, and heavy clay soils. It can successfully be grown with mean annual temperature 0-48^{0}C, and rainfall 500-1500 mm. High temperature and humidity is good for fruit development and ripening.

Planting

Timru seedlings or grafts are planted during monsoon season (July-August) under rainfed conditions in central India. In general, pits of 1 m × 1 m × 1 m size are dug at a distance 6 m × 6 m. Pits are filled with a mixture of top soil and FYM along with 200 g SSP and 200 g neem cake. However, seedlings are planted at 2 m × 2 m if it is grown for the production of leaves. Drenching of pits with Tafaban (chlorpyriphos) @1-2 ml/L is effective to avoid the termite attack. It is a slow growing tree; therefore, more than one year old seedling having well-developed roots should be planted. It is a hardy plant, once established seldom

Developing fruits of timru

requires any application nutrients. However, during first 2-3 years, 10 kg FYM and 30-50 g N:P:K each should be applied during monsoon. These doses should be doubled after 3-5 years.

Training and pruning

Heavy pruning is recommended to promote its vegetative growth for leaves. However for fruit production, after harvesting of fruits in bearing trees, stubs of previous season fruits are removed to facilitate new growth and fruiting terminals as it flowers on new growth. The best time of pruning is summer after harvesting of fruits. As plant growth is slow, development of scaffolds and branches may take 3-4 years. It is important that scaffold branches are evenly distributed in all directions and criss-cross twigs are removed in early stage.

Irrigation

Timru is a drought hardy plant and can be grown successfully under rainfed condition; however, plant may be given need-based irrigation for initially 1-2 years of plant establishment, particularly during summer. In bearing trees, irrigation during fruit development period improves fruit yield by reducing the fruit drop and enhancing pulp content. Mulching of basins with locally available organic mulch during summer helps to improve the efficiency of applied water and maintains uniform soil moisture in root zone.

Insect pest and disease management

Generally, timru is not much affected by the attack of insect and pests and diseases in rainfed semi-arid conditions of central India. Leaf defoliators cause damage to newly emerged leaves during new growth stage of plants. It can be controlled by 1-2 sprays of Dimethoate @1.5-2.0 ml/litre at 15 days interval. Sometimes *Cercospora* leaf spot and anthracnose cause foliar diseases. During rainy season, Copper oxychloride (3 g/litre) may be sprayed to check foliar diseases.

Harvesting and yield

Timru is a non-climacteric fruit which ripens on trees itself. Therefore, harvesting of fruits should be done at right stage of maturity. When fruits turn yellow-orange in colour, they should be harvested. At the time of maturity, fruit peduncle develops abscission layer and are separated easily from the main fruit stalk. The fruits can be stored for 4-5 days at ambient temperature after full ripening. Under natural condition, a timru can yield 30-70 kg fruits annually depending upon age, soil and climate.

Harvested fruits

Future prospects

Tendu/timru is an underutilized fruit species, mainly known for bidi leaves for its commercial value. It has wider adaptability under adverse soil and agro-climatic conditions and tolerance against biotic and abiotic stresses. Thus in the scenario of climate change, it has a bright future in the country to be exploited as a fresh nutrient rich fruit as well as for development of health promoting value-added products. Timru fruits are rich in nutritional value and anti-oxidant properties and need is to make the common people aware of it. Development of high yielding dwarf cultivar will give impetuous to its commercialization as a climate resilient fruit crop.

SUMMARY

Fruit pulp of timru is rich source of vital nutrients, sugars, minerals and β-carotene and has many health and medicinal benefits. It is consumed as fresh in tribal belts of central India, however, juice, nectar and jam are also be made from the pulp of timru fruits.

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Flowers always make people better, happier, and more helpful; they are sunshine, food and medicine for the soul.

– Luther Burbank