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Tendu: An Underutilized Wild Fruit

***Diospyrus melanoxylon* Roxb., is commonly known as tendu, belonging to the family Ebenaceae which is endemic to the Indian subcontinent. It is an underutilized edible fruit and is the most important fruit of Central India (Madhya Pradesh, Chhattisgarh, Jharkhand, Odisha and some parts of Uttar Pradesh) and forest regions. It is evergreen or deciduous in nature depending upon its habitat. The paper discusses the general properties of Tendu and its importance.**

DIOSPYRUS melanoxylon Roxb., is an underutilized edible fruit and it is known as Tendu (Uttar Pradesh), Kendu tree (Orissa, Jharkhand and West Bengal), temburini (Madhya Pradesh, Chhattisgarh), karai (Tamil Nadu), Kari (Kerala), Tembru (Gujarat), Abnus (Telugu) and East Indian Ebony or Coromandel Ebony (English). The generic name *Diospyrus* is derived from the Greek word 'Dios' means divine and 'Pyrus' means fruit belonging to the family Ebenaceae. The species name *melanoxylon* is Greek in origin meaning dark wood. This fruit is native to India and Sri Lanka and is one of the most important fruits of Central India and forest regions as it is the main source of income for the local people and tribal communities. It is widely distributed throughout India such as Madhya Pradesh, Maharashtra, Bihar, Jharkhand, Uttar Pradesh, Odisha, Andhra Pradesh, Gujarat and Rajasthan. It is also found on a small scale in Karnataka, Kerala and Tamil Nadu.

It is a medium-sized, subtropical deciduous or evergreen tree which grows up to 25 m in height. It is deciduous in dry regions for a short time in hot summer (May-June) whereas; in moist regions, it is evergreen. It is tolerant to frost and drought but sensitive to water logging conditions. The bark of this tree is pelican in colour, exfoliating in rectangular scales. The leaves are arranged simply opposite and (or) alternate, and the length of the leaf varies up to 35 cm long. The leaves are tomentose on both sides at young phase, becoming glabrous on above side when fully grown. It bears three types of flowers i.e., pistilate, staminate and hermaphrodite but sometimes dioecious exists. Under such conditions, suitable pollinizers are required for pollination. Staminate flowers are mauve in colour, 1-1.5 cm long, sessile in short peduncles and mostly three-flowered. Female flower is also mauve but larger than male flower and it has four lobbed large dark green calyx. The tree bears flowers in February-April and fruits become ripe in May-June. Its fruit develops from the superior ovary and drupe type of fruit. Calyx remains attached to fruits which provide better attachment to fruits with branches. The fruit is olive green, while the shape is ovoid or globose and it comprises 1-8 seeds but generally 4 seeds occur. The edible portion of this fruit is yellow pulp. The taste of this fruit is sweet with mild aroma.

This fruit can be grown in a wide range of soil; forest soil with high humus content is very suitable for the cultivation of this fruit. It is hardy in nature and can be grown in rocky soils. It can grow where annual temperature varies from 0° to 48° C and annual rainfall ranges from 500 to 1,500 mm. The seeds are recalcitrant and lose their viability within a short period. There is a lack of information on the propagation of tendu fruit. Most of the plants available in the forest are naturally regenerated through seedlings. The vegetative propagation can be done through budding and grafting during January to March.

Nutritional composition

The fruit is very nutritive and rich in sugar, fibre, protein and ascorbic acid. It is also a very good source of phenols, carotene, flavonoids, terpenoids, saponin and tannin. The tendu fruit comprises moisture (79.1-82.4%), protein (0.43-0.58%), crude fibre (0.37-0.49%), TSS (16.20-19.50°Brix), glucose (1.05-11.90%), fructose (4.65-6.79%), soluble pectin (4.40-7.29%) and soluble tannin (0.50-0.68%) per 100 g of ripe edible fruit. The fruit is rich in sugars (28.60 g), ascorbic acid (2.80 g), phenol (1.72 g), carotene (22.00 g) and ash (0.25 g) per 100 g of pulp. Ripe fruit is a very important source of fumaric acid and gallic acid.

Importance and Uses

1. Non-timber forest products (NTFPs)

Non-timber forest products (NTFPs) are the most important part of livelihood for local and tribal communities of India and act as their main source of income. According to the Tribal Co-operative Marketing Development Federation of India Ltd, GoI, 20-40% of annual income comes from the NTFPs to the tribal communities. Leaves of the tree are widely used for making excellent quality wrappers for tobacco beedi. It acts as an off-season source

Immature fruits and leaves of tendu

Mature fruits of tendu

of income for tribal communities, especially women. 80% tendu leave collectors are women, enabling small-scale employment opportunities for women.

Tendu leaves are also used for making biodegradable plates, which would help in uplifting the socio-economic status of tribal and rural people as it is a great alternate option for the use of biodegradable dining plates in future. Leaves contain 7.12% crude protein and 25.28% crude fibre, therefore leaves are very good for fodder purposes and can generate good income through this.

2. Medicinal importance

The bark of tendu tree has an astringent taste due to the presence of tannin and its decoction is used to cure dyspepsia and diarrhoea. The dilute extraction of bark is also used as an astringent lotion for eyes. The alcoholic extracts of tendu bark have antipyretic, anti-inflammatory and analgesic properties. The aqueous extracts of the stem bark are used to cure jaundice by tribal communities. Fruits are used to cure stomach disorders.

3. Value-added products

The fruits get wasted due to lack of proper post-harvest management and the shelf life of tendu fruit is very low (less than 1 week). The wine from tendu fruit in India is well-accepted among the consumers.

4. Others

The pericarp of fruit is also a good source of crude fibre, potassium, magnesium, phosphorus and calcium; and can be used as a low-cost source for extraction of phytochemicals or can be used for feeding and preparation of manures. The fruit extracts exhibited great DPPH scavenging, hydrogen peroxide scavenging, hydroxyl radical scavenging and reducing power assay activity. The tendu leaf refuse waste from the beedi industry has great removal efficiency of phenol and heavy metals such as chromium (97%), copper (96%), cadmium (81%) and magnesium (75%) from aqueous solution.

Future thrust

Diospyrus melanoxylon Roxb. is a wild and underutilized edible fruit and is widely spread in wild form. It has great nutritional value as a fruit and is imperative to bring awareness among the people. However, the shelf life of this fruit is very short and there is a need to focus on developing post-harvest management practices for increasing its shelf life. There is also a lack of standard propagation method which needs attention to standardization. Considering the importance of the fruit and its benefits, there is a need to conserve the germplasm and undertake crop improvement programs for effective utilization of the crop.

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Tomato Hybrid Kashi Adbhut (VRNTH-18283) for high temperature: Suitable for high day temperature of 38±2°C and night temperature of 32±2° C. Semi-indeterminate plants, fruit weight 60-30 g with yield potential of 520 q/ha, having TSS 3.7⁰ Brix and acidity 0.25%. Crop duration February to June under north Indian plains. Availability of fruits up to 2nd week of June. Identified by Institute Technology Identification Committee. Proposal for release and notification submitted to U.P. State Government in April 2022.

Tomato Hybrid Kashi Tapas (VRNTH-19095) for high temperature: Suitable for very high day temperature of 38±2°C and night temperature of 32± 2°C. Semi-indeterminate plants. TSS 5.4⁰ Brix & acidity 0.38%. Yield potential is 448 q/ha. Fruit weight is 45-40 g. Crop duration February to June under north Indian plains. Availability of fruits up to 1st week of June. Identified by Institute Technology Identification Committee. Proposal for release and notification submitted to U.P. State Government in April 2022.

Source: ICAR-Annual Report 2022-23