



TENDU: A WILD EDIBLE FRUIT OF SOUTH INDIA

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INTRODUCTION

South India's rich tapestry of biodiversity includes the indigenous fruits of Telangana, Andhra Pradesh, Tamila Nadu and other regions western ghats. These indigenous fruits are known for their cooling and astringent properties, and have a deep affinity for these fruits. Tendu, also known as Malabar ebony, Coromandel ebony, East Indian ebony, and most popularly Tendu in Hindi, Kendu, and Tuniki in Telugu. It is a lesser-known fruit found in local markets in these southern states of India. *Diospyrous melanoxylon* Roxb. in the family of Ebenaceae and native to India and Srilanka. Mostly found in Orissa, Madhya Pradesh, Chattisgarh, Andhra Pradesh, Telangana, and other central and southern Indian states, it is well-liked by the tribal communities. Despite competition from exotic imports, these indigenous fruits remain popular in local markets.

ORIGINS, DISTRIBUTION, AND AVAILABILITY

The Tendu, a flowering tree native to India and Sri Lanka, is a characteristic tree in dry deciduous forests throughout India. Originating from Coromandel, it covers the entire Indian peninsula and extends up to Nepal in sub-Himalayan tracts. The plant is also found on the Nilgiris and Serawalli hills in the south. It belongs to the Ebenaceae family, with over 400 species worldwide. Tendu plants, native to tropical and subtropical regions, are

found in dry deciduous forests and mixed forests. They are primarily used for Bidi leaves, but no systematic fruit production has yet been established.

BOTANICAL INFORMATION

Tendu is a medium-sized, subtropical deciduous, or evergreen tree that grows up to 25 meters in height. It is tolerant to frost and drought but sensitive to water logging conditions. The bark is pelican in color and the leaves are opposite or alternate, up to 35 cm long. Tendu bears three types of flowers: pistillate, staminate, and hermaphrodite, with sometimes dioecious situations. The tree bears flowers in February-April and fruits ripen in May-June. The fruit is olive green, ovoid, or globose, with 1-8 seeds. The edible portion of the fruit is yellow pulp, with a sweet and mild aroma. Tendu flowers start after 5-7 years of planting and flowering occurs on new growth. The fruit is a drupe, developed from the superior ovary, and the pulp is yellow, soft, and sweet.

NUTRITIONAL AND HEALTH BENEFITS

Tendu fruit is a nutritious and low-calorie snack that is rich in vitamins, minerals, and antioxidants. It is known for its high vitamin C content, making it an excellent choice for immune health. The fruit is rich in sugar, fiber, protein, and ascorbic acid, as well as phenols, carotene, flavonoids, terpenoids, saponin, and tannin. It ripens in May-June and

contains approximately 81% carbohydrates, 2% protein, 2% fat, and 1% fiber. It is rich in minerals like calcium, magnesium, iron, zinc, and copper. Tendu fruit wine is popular among the tribal community and contains total sugar, tartaric acid, phenolics, β -carotene, ascorbic acid, lactic acid, methanol, and ethanol.

Tendu wine, a popular food in tribal communities, has potent antioxidant activity and is linked to diabetic complications due to sustained postprandial hyperglycemia. Hyperglycemia-induced oxidative stress is a precursor to these complications, and prolonged hyperglycemia exacerbates this risk. To combat dysmetabolic disorders, dietary material with flattened postprandial glycemic response and antioxidative stress potentials could be beneficial. This study aimed to understand the fruit's effect on carbohydrate and lipid-digesting enzymes.

CULTURAL SIGNIFICANCE

The Tribal Co-operative Marketing Development Federation of India Ltd reports that 20-40% of annual income from non-timber forest products (NTFPs) comes from tribal communities in India. Tendu is revered for its medicinal properties, treating ailments like digestive issues and skin disorders. The leaves of the tree are used in tobacco beedi wrappers, while the bark extracts have antipyretic, anti-inflammatory, and analgesic properties. The stem bark is used to cure jaundice, while the fruit extracts are used for DPPH scavenging, hydrogen peroxide scavenging, and hydroxyl radical scavenging. Tendu leaves, rich in protein and fiber, can be used to create biodegradable plates, boosting socio-economic status and providing a viable alternative for future dining options.

SOILS AND CLIMATE

Tendu fruit, a hardy subtropical deciduous fruit plant, thrives in rocky soils with high humus content. It can grow in temperatures ranging from 0°C to 48°C and rainfall from 500 to 1,500 mm. The plant can be propagated through budding and grafting and can grow in laterite and black soil. For commercial cultivation, soil with good water-holding capacity and humus content is ideal. Tendu can grow up to 0-900 m altitude and thrives in rocky soils with mean annual temperatures ranging from 0-48°C and rainfall ranging from 500-1500 mm.

PROPAGATION AND TRAINING PRUNING

Tendu plants are naturally regenerated through seedlings, coppice, and root suckers, but propagation is often done through direct seeding or nursery-raised seedlings. Seed germination is not a problem in tendu, but it takes over 70-80 days to reach satisfactory results. Stratification and priming of seeds are beneficial for germination and seedling growth. Choosing the appropriate rootstock and standardizing the age and vigour of Tendu seedlings is essential for successful vegetative regeneration. Grafting and budding can be successful during January-March on appropriate rootstock, and hermetic storage can maintain viability for up to a year.

SUSTAINABLE HARVESTING PRACTICES AND POSTHARVEST

Tendu fruits, a non-climacteric fruit, play a crucial role in maintaining the delicate balance of forest ecosystems. Local communities have developed techniques for responsible harvesting, ensuring minimal environmental impact and contributing to biodiversity conservation. Tendu fruits are harvested at the right stage of maturity for

market point, with misshapen and undersized fruits sorted before packing. Tendu leaves the second largest forest product in India, is used in making local cigarettes called Bidi. Madhya Pradesh is the largest producer, with an annual production of around 300,000 tonnes. Tendu wine has been developed from Tendu fruits, which are seasonally available in South Asian countries like India during the summer months.

CONCLUSION

South India's rich biodiversity and cultural heritage are showcased in the underutilized Tendu fruit, a deciduous forest tree with wide adaptability and tolerance against biotic and abiotic stress. This fruit, known for its nutritional value and antioxidant properties, has a bright future in the food security. However, it requires attention to genetic conservation, development of high-yielding dwarf varieties, standardization of propagation techniques, and incorporation of integrated forestry-based cropping systems. Furthermore, focusing on post-harvest management practices and standard propagation methods is crucial for increasing the fruit's shelf life and ensuring its effective utilization. Conservation of germplasm and crop improvement programs are also essential for the preservation of this valuable resource.