

Unlocking the Power of Tendu: India's Forgotten Fruit

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Abstract

Tendu (*Diospyros melanoxylon*) is a fruit species that falls under the Ebenaceae family. It is one of the lesser-known fruit varieties that grow in India and other parts of Asia. This species mainly grows in the deciduous forests that are present in India. Tendu is a nutritious and medicinal fruit that has been largely neglected and underutilized since modern methods of fruit harvesting and processing were developed. The main components of Tendu are carbohydrates and dietary fibre, and it is also a good source of important vitamins and minerals that are crucial for energy and general well-being. The plant is also used in the formulation of medicines to treat digestive issues, wound healing, and regulation of bile discharge. It has bioactive constituents such as saponin, tannin, terpenoid, and alkaloid, which possess anti-inflammatory, antimicrobial, and analgesic properties. Thus, Tendu has significant potential in the area of therapy with positive case study reports in terms of the cure for scabies, blood conditions management, and resistance to malaria. In addition, the Tendu wood is hardy and can act as a clean source of renewable energy for many years to come. However, very few products are available on the market that use Tendu alternatives. This fact is mainly due to the lack of ease and efficiency in the preservation and marketing of the material. Consequently, this article highlights the nutritional, medicinal, and economic value of the Tendu fruit, emphasizing its role in broader objectives aimed at enhancing community health and promoting a healthier population. Raising public awareness of existing technologies and investigating ways to harness Tendu could greatly assist in achieving improvements in food security, as well as fostering environmental and socio-economic progress.

Keywords: Tendu, *Diospyros melanoxylon*, nutritional value, medicinal properties, sustainable harvesting, tribal livelihoods, bioactive compounds, market potential.

Introduction

Tendu scientifically is referred to as *Diospyros melanoxylon* Roxb., and it is a fruit that passes without

notice, belonging to the Ebenaceae family and mainly distributed in India and other areas of Asia. This wild fruit is often overshadowed by more commercially favoured varieties; however, it is rich in bioactive compounds, including antioxidants, alkaloids, essential oils, flavonoids, saponins, tannins, and terpenoids. Some of these are reported to offer various potential health benefits, which include antipyretic and anti-inflammatory properties, as depicted in many research studies (Hmar et al., 2017; Maridass et al., 2008). These large size matured Tendu fruits are collected from May to July, when they become sweet and turn yellow in colour. Though nutritionally advantageous and culturally valuable, especially among the tribal population of states like Odisha, Jharkhand, and Madhya Pradesh, Tendu finds an overlooking place in urban markets due to lack of awareness about appropriate post-harvest handling and processing techniques. An adult Tendu tree can yield around 80-100 kg of fruit a year; however, most of this produce is sold at minimal prices in local markets. The fruit's strong skin and short shelf life create barriers to preservation and marketing. However, there is still much room for value addition to Tendu fruit. Value addition could, in fact go beyond market appreciation and create economic benefit for the tribes who depend on this resource to sustain their life. This article seeks to study the untapped potential of Tendu fruit, with focus on its nutritional, medicinal, and value addition avenues to reduce losses and improve prospects for its gatherers. *Diospyros melanoxylon* is the scientific name for kendu fruit, which is spherical fruit, about 3–4 cm in diameter, and containing three or four elongated, compressed seeds. It is a rather unstudied fruit, but greatly essential to diet, especially among locals growing it, because of an abundance of needed nutrients.

Profile of Nutrition

The Kendu fruit, *Diospyros melanoxylon*, is a rich source of nutrients for the cultures that cultivate it. It mainly provides carbohydrates, which are mostly in the form of natural sugars, accounting for 81% of its caloric value, thus providing rapid energy. The fruit contains 2% protein, which is important for muscle

health and other body functions. Additionally, the 2% fat content gives energy density and aids in the absorption of fat-soluble vitamins.

The above nutrients support health in the gastrointestinal tract through enhancing regular bowel movement and supporting the gut microbiota. The fruit is a good source of nutrition, contributing 349 Kcal per 100 grams, containing 11% fiber. It contains important minerals such as calcium at 11.8% that contributes to bone metabolism as well as being a major requirement for metabolism in the body; magnesium is found at 62%, associated with bone metabolism and healing processes. Although it contains only 0.2% copper, this essential trace element is necessary for iron metabolism and heart health. The fruit also contains vitamins and carotenoids, including vitamin C (49 mg), which boosts immunity and acts as an antioxidant, as well as β -carotene (260 μ g), another antioxidant that converts into vitamin A and supports eye and skin health.

Usage in Medicines

The kendu fruit is valued for its medicinal properties, especially because of its astringent and cooling effects. People use this fruit to relieve the discomfort caused by the intense heat of summer.

Unripe fruit has been used for ages to treat digestive problems, such as bloating and stomach upset, due to its antispasmodic properties.

Mature fruit is thus used to reduce excessive bile production. With this, the remedy becomes very effective when people undergo digestive disorders.

Kendu fruit extracts are applied topical to treat the wound and some skin irritations due to its anti-bacterial component. The fruit powder, resulting from the dry fruit, comprises 15% tannin on dried forms. In half ripened fruits, it can extend up to 23%. Tannin would enhance the effects of the fruit as an astringent carminative against gastrointestinal problems.

Kendu is employed in traditional medicine to manage various diseases including rheumatoid arthritis and abdominal pain, demonstrating its wide utility in ethnomedicine

Phytochemical Composition

The phytochemical profile of the methanolic extract of Kendu is replete with medicinal importance:

- Saponins: It acts as an immune-enhancer.

- Tannins: It has anti-inflammatory properties and can act as a broad-spectrum pathogen eradicator.
- Terpenoids: Possess antimicrobial activities.
- Phenols: Antioxidant in nature; protect cells from oxidative stress.
- Alkaloids: Analgesic in nature and help in alleviating pain.
- Essential oils: These confer flavour to the fruit and are also medicinal in nature. Combining all these constituents, the medicinal value of Kendu fruit makes it a resourceful medicinal one in traditional medicines.

Bark and Leaves

The leaves of the Kendu tree are not only nutrient-rich but also exhibit medicinal activity. Nutritional Evaluation: It can be used as supplementary nutrition due to the presence of 7.12% crude protein and 25.28% crude fibre.

Medicinal Use

The leaves are used as a purgative and carminative for gut health, and they may be applied to the body for the treatment of scabies or even old wounds by virtue of its antibiotic properties. Traditionally, the bark is used in medicine to "treat" smallpox. Recent studies have demonstrated that Kendu bark has great ant plasmodial activity against *Plasmodium falciparum* and thus may prove useful in fighting malaria.

Flowers and seeds

Dried flowers of the Kendu tree are known to have medicinal value. In folk medicine, they have been used in the treatment of diseases related to blood disorders, skin problems, and urinary tract infections. The seeds, sold usually with the fruit in the markets, are powdered and are given to reduce palpitations of the heart, nervous breakdowns, anxiety disorders, and psychoses. Their sedative properties make them valuable in herbal mental health remedies.

Economic Value of Tendu Fruit

Tendu fruit provides economic benefits to village and tribal communities, creating income opportunities and supporting livelihoods. Certain challenges hinder its successful commercialization.

- ❖ **Postharvest Losses:** Tendu fruits have a limited shelf life and a tough outer skin,

making storage and transportation challenging. Due to inadequate processing facilities in various regions, post-harvest losses are significant.

- ❖ **Lack of awareness:** The nutritional and medicinal benefits of Tendu fruits are not well recognized, even among local communities and within the global market.
- ❖ **Processing and Value Addition:** There is significant potential for creating value-added products such as jams, juices, dried fruits, and powdered extracts. These products would not only extend the shelf life of Tendu fruit but also increase its market appeal.
- ❖ **Sustainable Harvesting and Value Addition:** It is crucial to establish postharvest processing methods to fully realize the benefits of Tendu fruit.
- ❖ **Drying and Dehydration:** Dehydrating the fruit aids in retaining its nutritional content and prolonging its shelf life, making it suitable for export and commercial use.
- ❖ **Jams and Preserves:** Tendu fruit is ideal for creating preserved items like jams and jellies due to its elevated sugar content and distinctive flavour.
- ❖ **Powdered Extracts:** Dried Tendu fruits can be ground into powder, which can then be utilized in dietary supplements, functional foods, or as an ingredient in herbal remedies.

Conclusion

Apart from its nutritional value, the Kendu tree also has therapeutic benefits and economic contributions. It is therefore prudent for communities to boost their livelihoods by promoting sustainable harvesting and processing methods for the fruits and other parts of these trees, thereby increasing household income and aiding environmental conservation.

The greater production of this relatively overlooked fruit and the value-added products derived from various parts of the tree presents significant potential. Future initiatives should focus on raising awareness within government entities and non-government organizations to educate the public about the nutritional and medicinal benefits of the Kendu tree.

Summing it up, the Kendu fruit is a very rich source of nutrition and health-related benefits that can powerfully build up community livelihoods and enhance health and wellness. Its potential as a climate-resilient crop makes it a very valuable resource in trying to address food security challenges within an ever-changing environment. Conclusion In short, the Kendu fruit represents a real treasure trove of nutritional advantages and health-related applications that can uplift community livelihoods while promoting overall health and wellness.

In summary, Kendu fruit provides an excellent opportunity for nutrition and health-related advantages to be positively leveraged toward strengthening community livelihoods and general health and well-being. With its potential as a climate-resilient crop, it holds significant value as a resource toward meeting food security needs in this changing environment. To sum up, the Kendu fruit presents a real goldmine of nutritional benefits and health-related usages that are meant to support community livelihoods and general health and well-being.

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