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A Review Note on *Diospyros ebenum*



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ABSTRACT

Traditionally, medicinal plants have been used to treat a wide range of illnesses. *Diospyros ebenum* is a plant that is well-known in India. It has always been quite important in terms of therapy. The plant is a major component in homeopathic, Unani, and Ayurvedic medicine. can cure a wide range of illnesses, including skin conditions, heart issues, and diarrhea. The traditional medical system makes use of many plant components, including leaves, stems, bark, and fruits. Gathering current information on the pharmacological, ethanobotanical, and natural phytochemical value of this plant is the aim of the current study.



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INTRODUCTION

An evergreen tree with a thick crown that grows slowly is called *Diospyros ebenum*, or ebony. The tree is referred to as timber. Native to southern India and Sri Lanka, Indian ebony trees. The reason it is so well-known is because it is an ebony-producing tree. Although this tree's wood is sometimes referred to as "ebony," it is also known as Ceylon or India ebony. Standing 20–25 meters tall, it is a medium-sized evergreen. The leaves are whole, elliptic-oblong, and are around 6–15 cm in length and 3-5 cm across. Like a miniature persimmon, the fruit is a tiny berry with a diameter of 2 cm. Dry and intermediate regions are native to this slowly growing tree. 1

Pyro/Enum / Dios

Diospyros is a Greek word that combines the words "dios" (divine) and "pyros" (grain or wheat), perhaps meaning "food of the gods" or "divine fruit." *Ebenum*: refers to the black wood of the tree; it is the Latinized version of the Greek word "ebenos," which means "ebony". 2, 3

Name according to botany: *Diospyros ebenum*

Alternative name:

Diospyros asmilis

Diaphoros glaberrima

Diaphoros laurifolia

Indian ebony, and Ceylon ebony are common names.

Taxonomy

Group: Angiosperms (Flowering Plants) – I – Dicotyledons

Kingdom: Plantae

Subkingdom: Viridiplantae

Infrakingdom: Streptophyta

Superdivision: Embryophyta

Division: Tracheophyta
Subdivision: Spermatophytes
Order: Ericales
Family: Ebenaceae
Genus: Diospyros
Species: *Diospyros ebenum* 4

Cultivation & Care

Diospyros ebenum cannot tolerate freezing and must be planted in a tropical area. Usually, seeds are used to proliferate it.

Inclination for soil

Although it can tolerate a variety of soil types, *Diospyros ebenum* likes rich, well-drained soils.

Watering:

The tree has to be watered often, especially in dry spells. Waterlogging is not tolerated, though.

Sun Essentials

For *Diospyros ebenum* to flourish, full sun to moderate shade is excellent.

Pruning

Diospyros ebenum often doesn't require pruning, but if it is, it should be done to get rid of any damaged or dead branches. To make precise cuts without endangering the tree, use sharp, clean pruning tools.

Description:

Morphology:

Size: The trunk diameter of *Diospyros ebenum* ranges from 0.5 to 1 meter (1.6 to 3.3 feet), and it may reach a maximum height of 20–25 meters (65–82 feet).

Habit: Tree heights up to 12 meters

Bark on the trunk: It is smooth and black.

Branchlets are terete and glabrous, whereas branches are Leaves Simple, alternate, distichous leaves; petiole 0.3-0.8 cm long, glabrous, subterete; lamina 5-13.5 x 1.5-4.5 cm, elliptic or oblong, apex acuminate with a blunt tip or obtuse, base acute to rounded, margin entire, midrib flat; secondary nerves 5-8 pairs, lowermost pairs close and acute in angle; tertiary nerves reticulate.

Flower or inflorescence: Flowers are unisexual; the males have subsessile, cream-colored, three-flowered axillary cymes, while the females have solitary, subsessile, axillary, 0.2-cm-long pods.

Fruit and Seed: Berry with apical, globose, or subglobose, up to 2 inches in diameter, and accrescent, reflexed fruiting calyx lobes; typically contains 4 seeds, but infrequently up to 8 seeds.

Odour: No distinctive smell is there while using this wood.⁵ The hue and appearance of the heartwood of this tree are coal black, except occasional streaks of gray or dark brown. Heartwood may easily be distinguished from sapwood, which is pale yellow. Even the finest ebony appears, ironically, to be black plastic.⁵

Habitat: Plains to Mid-Altitude, Dry Deciduous to Moist Deciduous Forests; canopy trees in evergreen forests, up to 800 m. Reticulate venation is found on leaves.

Ecosystems: evergreen forests, lowland forests, coastal forests, and humid 12 cm-tall trees.

Type of root system: Taproot.

Seed Time to Germination: 14–30 Days

Ideal temperature range: 15°C to 40°C (warm, humid environment; suitable for mild woodland conditions) 6

Leaves: Simple ,0.3–0.8 cm long petiole 6



Fig (1) Diospyros ebenum 7



Fig (2) Fruits of Diospyros ebenum 8,9,10

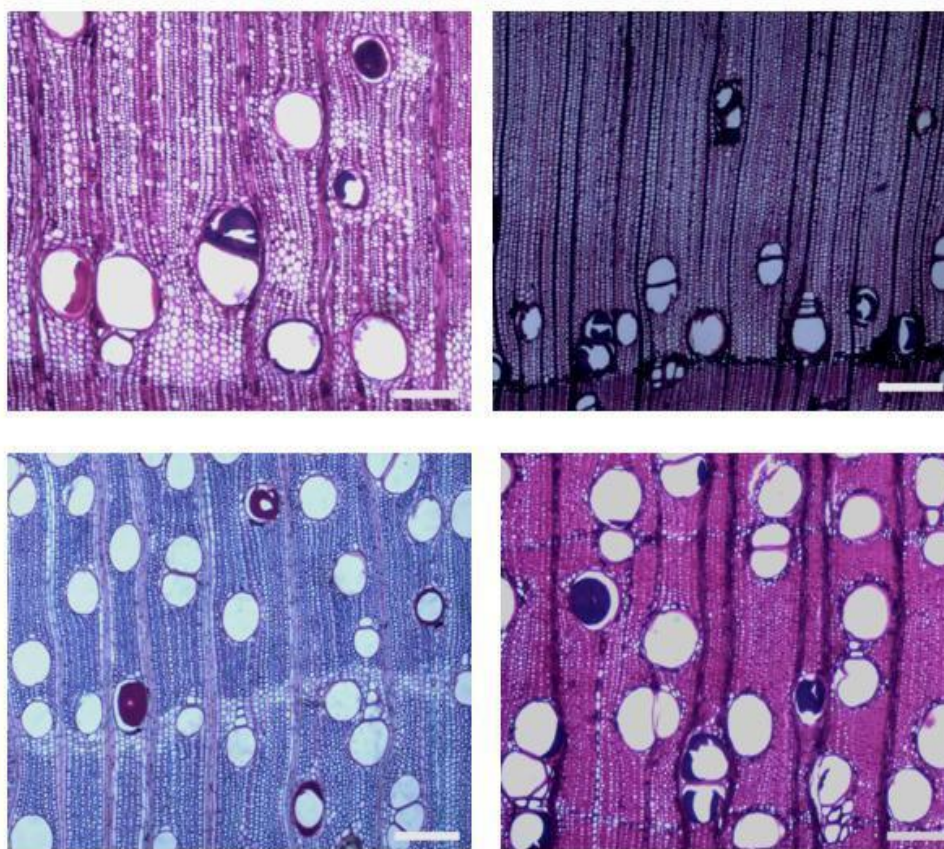
Wood:

Since Ceylon ebony trees are scarce and their wood is extremely costly, it is nearly hard to find them these days. It has virtually no pitting, a glossy, smooth surface, is resistant to termites and water, and is quite durable it is twice as hard as oak. It is also easy to clean and appropriate for high-quality polishing, which will leave it completely smooth. Wood is not able to float due to the tree's extraordinarily high wood density (400 kg/m³). Treating it mechanically and manually is also difficult. The small grain of the wood itself makes it brittle. 11,12,13



Microscopy of *Diopyros ebenum* 14,15

Wood anatomical features of the genus *Diospyros* (a) Cross sectional view of *D. ebenum* x 105. (b) Radial longitudinal section of *D. ebenum* x 660, (c) Tangential longitudinal section of *D. ebenum* x 660, (d) Cross sectional view of *D. moonii* x 105, (e) Radial longitudinal section of *D. moonii* x 660, (f) Tangential longitudinal section of *D. moonii* x 660, (g) Cross-sectional view of *D. montana* x 105, (h) Radial longitudinal section of *D. montana* x 660 and (i) Tangential longitudinal section of *D. montana* x 660.



Phytochemistry:

Several species in this genus have yielded phytochemical components that have been isolated, including lipids, benzopyrones, naphthoquinones, oleananes, lupines, terpenoids, polyphenols, tannins, hydrocarbons, and taraxerans.¹⁶

Proteins, saponins, steroids, tannins, terpenoids, alkaloids, carbohydrates, coumarins, flavonoids, glycosides, and phenols were discovered by phytochemical screening of leaves. The phenolic content of a methanolic extract was substantially greater than that of hexane and diethyl ether extracts.^{17,18,19}

After fruit extracts were subjected to phytochemical screening, tannin-free essential oils, saponins, terpenoids, flavonoids, and alkaloids were found.

-Amyrin, Lupeol, Betulin, Betulinic acid, Ursolic acid, Bauerenol, β -sitosterol, Stigmasterol, Ebenone plumbagin, Hexacosanol, 4-hydroxy-4, 5-dimethoxy-2-naphthaldehyde, 4-hydroxy-4, 5-dimethoxy-2-naphthalene, 4-hydroxy-4, 5-dimethoxy-2-naphthoic acid. 19

Pharmacological studies:

Antioxidant Activity: The antioxidant activity of *Diospyros ebenum* was demonstrated by scavenging DPPH free radicals in petroleum ether, ethyl acetate, methanol, and aqueous extracts.

Mohammed et al. (2016) studied the total phenolic and flavonoid content of methanol, ethanol, and petrol ether leaf extracts of *Diospyros ebenum* as well as in-vitro antioxidants utilizing the DPPH test. 20

Anti-bacterial activity: Antibacterial activity against *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Salmonella typhimurium*, and *Enterobacter aerogenes* was demonstrated using petroleum ether, ethyl acetate, methanol, and aqueous extracts of *Diospyros ebenum* leads.

Anti-Inflammatory and Analgesic Activity

An enzyme 15-lipoxygenase (LOX) inhibition test conducted on an aqueous extract of *D. abyssinica* root bark revealed more anti-inflammatory efficacy than quercetin 21. In vivo biphasic tests, luteol isolated from *D. mespiliformis* stem bark has demonstrated analgesic activity in both pain inhibition (neurological-first phase) and origin (inflammatory-second phase).

Antihyperglycemic Activity

Another research indicates that oral treatment of a 400 mg/kg methanolic extract derived from *D. ferrea* leaves for 21 days significantly reduced hyperglycemia in diabetic rats.

***Diospyros ebenum* Leaf Extracts**

Antibacterial and antioxidant activities are two examples of the medicinal qualities of plants that have been studied. *Diospyros ebenum* Roxb. water extracts, petroleum ether, ethyl

acetate, and methanol were used in this investigation. were assessed for their antibacterial and free radical-scavenging (antioxidant) DPPH (2,2-diphenyl-1-picryl-hydrazyl) properties. Using the agar well diffusion technique, antibacterial activity was assessed against *Bacillus subtilis* ATCC6633, *Staphylococcus aureus* ATCC29737, *Pseudomonas aeruginosa* ATCC27853, *Salmonella typhimurium* ATCC23564, and *Enterobacter aerogenes* ATCC13048. Gallic acid and quercetin equivalents were used to calculate the extracts' total phenolic and flavonoid contents. The water extract was inactive against any of the five bacterial strains, according to the results, while the methanol extract was effective against each of them. DPPH free radical scavenging activity (IC₅₀ = 20 mg/ml) and total phenolic content were higher in the methanol extract. According to the current study's observations on the antioxidant and antibacterial properties of *Diospyros ebenum* methanol extract, phenolics may be the primary active component of this plant.²¹

Verified biological effects of *Diospyros* genus members include anti-oxidant, hepatoprotective, anti-inflammatory, analgesic, anti-pyretic, anti-microbial, anti-protozoal, fungicidal, anthelmintic, antihypertensive, anti-diabetic, insecticidal, molluscicide, cytotoxicity, anti-tumor, and sedative properties.²¹

Ayurvedic uses:

A native of various places, including India, ebony is a hardwood tree known in Ayurveda as "Tendu." Despite not being a commonly utilized medicinal plant in Ayurveda, several tree portions have been used medicinally:

1. **Dental and periodontal health:** Ebony tree bark has long been used for dental hygiene. Gum and tooth strength are greatly enhanced by it.
2. **Anti-Inflammatory property:** Its anti-inflammatory properties have been employed in several traditional treatments, where it may be beneficial for conditions involving inflammation.
3. **Wound healing:** It is said to have the ability to heal wounds and may be used topically.
4. **Astringent attribute:** certain sources claim that specific tree components contain astringent properties that can help firm and tone tissues.
5. **Dysentery and diarrhea:** Ebony may be utilized in some traditional methods to make a formulation meant to relieve the symptoms of diarrhea and dysentery.

6. Skin disorder: Due to its possible anti-bacterial and anti-fungal properties, bark may be utilized for a variety of skin diseases.²³

Unani uses

- Isa bin Kuhal, the scholar, promoted its usage in Unani medicine for ocular use. Used for many different conditions, including blood purification, spermatorrhea, burns and scalds, nephrolithiasis, scabies, eczema, leprosy, cataracts, night blindness, epistaxis, female sterility, and amblyopia. ²⁴

A Treasure in Unani Medicine: Diospyros Ebenum-Ebony - Ophthalmic Care: The eye health benefits of ebony are highly valued by Unani healers. It has been used to treat a variety of eye conditions, including pain, inflammation, redness, and other discomforts.

- **Astringent Properties:** Ebony's drying nature gives it astringent properties that are useful when there is excessive bleeding or discharge. Its use for dysentery and diarrhea is an internal manifestation of this.

- **Strengthening Action:** Ebony is said to stimulate the heart and other essential organs in Unani medicine, especially enhancing cardiac health.

- **Wound Healing:** Ebony's drying and astringent qualities on the outside allow it to promote wound healing by reducing discharges and promoting tissue regeneration.

- **Antiseptic:** Preparations made of ebony are said to have antiseptic qualities. Historically, they have been used in oral rinses to keep gum healthy and treat inflammatory disorders of the mouth, as well as in wound dressings to prevent infection.

- **Diuretic Action:** Some Unani formulas contain ebony to subtly encourage diuresis or a rise in the production of urine. This can aid in facilitating the evacuation of waste materials and lessen the circumstances of localized swelling, or edema.

- **Skin Health:** Astringent properties of ebony have occasionally been used by practitioners to treat excessive oiliness or as a base for certain skin disorders, in addition to its ability to heal wounds.

- **Hemostatic:** Ebony has the ability to stop bleeding since it is an astringent. It can be used with caution by unani practitioners to reduce external bleeding or treat situations of heavy menstrual flow. ²⁵

An assessment of the ethanolic extract of *Diospyros ebenum* proved to have hepatoprotective and antidiabetic properties.

Other Traditional uses:

1. It is used as an itchy ringworm and leprosy treatment.
2. Stem bark is used to treat diabetes, asthma, and cough in Tamil Nadu.
3. Bark is applied to wounds and cuts to halt bleeding.
4. To lessen blisters, apply crushed leaves to the face.
5. Whole plant paste used for mending wounds and treating skin conditions.
6. Key unani medication for ocular disorders

The leaf, which is the second most widely used portion of the *Diospyros* species, is used to treat skin diseases in a comparable percentage (18%) to that of the root, but more frequently (24%) for rheumatism, musculoskeletal bruising, painful fractures, and body pains.

The bark of *Diospyros* species' recorded medical applications are related to their efficacy in treating bacterial, fungal, and parasitic illnesses. Conditions including diarrhea, dysentery, and different infections of the skin and oral cavity are among them.

Other Applications

These days, the wood is frequently used for handcrafted artwork, ornamental wooden inlays, piano keys, fretted and bowed instrument necks, pegs, tailpieces, and nuts the areas of musical instruments that usually sustain the greatest wear and tear. In turnery, it's frequently utilized to create chopsticks, brush holders, and knife handles. 26

Marketed product:



1. It's a component in Ayurvedic medications like Kementose tablets, which are used to treat anxiety, tension, sadness, and neurosis.

2. 50 grams of 7006 Herbals Karungali Pattai Powder *Diospyros ebenum* Powder, Prescription

Utilized as the Product Synopsis:

3. Sugar Management and Relief from Stomach Issues. Our farmers cultivate all of the herbs naturally, without the use of artificial fertilizers, and 7006 Herbs is approved by the Drug Administration and Siddha. Natural Substance In. 27

Conclusion

Further research is necessary to determine whether *Diospyros ebenum* may be used to treat anti-inflammatory, anti-diabetic, anti-oxidant, and analgesic problems. *Diospyros ebenum's* medicinal potential will be enhanced by the findings of these studies. Confirming the results and identifying the bioactive metabolites is needed.

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