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Phytopharmacological activities of *Cinnamomum tamala*

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Abstract

Cinnamomum tamala is a multifunctional evergreen shrub native to India. The plant goes by many names, including Indian cassia, Tejpatta, and Indian bay leaf. Because of the presence of major phytoconstituents, all parts of the plant are useful for the treatment of various diseases or disorders such as cancer, cardiac diseases, diabetes, anxiety, depression, ulcer, GI diseases, and possess many pharmacological activities such as anti-oxidant, anti-hypercholesterolemia, anti-diarrhoeal, anti-inflammatory, anti-fungal, antibacterial, and others. In ancient times, the plant was also utilised for its therapeutic purpose, and because it has fragrant properties, it is used in the perfumery industry, as a mouth refresher, and to remove undesirable odours from the body and mouth. It is also employed in the pharmaceutical sector. The plant's leaves have flavouring agent properties and are used as a flavouring ingredient in foods such as curry, fast food, pickles, and spices. The primary goal of this review/study was to promote and improve awareness of the utilisation of this versatile evergreen plant.

Keywords: *Cinnamomum tamala*, phytopharmacology activities, pharmacology activity

Introduction

"*Cinnamomum tamala*," often known as Indian bay leaf or Tejpat. Let me give you an introduction to *Cinnamomum tamala*.

Cinnamomum tamala is a tropical evergreen tree found in India and other regions of South Asia. It belongs to the Lauraceae family, which includes cinnamon and bay laurel. The tree is famous for its aromatic leaves, which are widely used as a spice in Indian cuisine. These leaves are commonly referred to as Indian bay leaves or Tejpat.

Key characteristics and applications of *Cinnamomum tamala*

- 1. Aromatic Leaves:** *Cinnamomum tamala* leaves are exceedingly aromatic and fragrant. They are used to flavour a variety of meals, particularly Indian and South Asian cuisines [14].
- 2. Culinary Uses:** Indian bay leaves are often employed in the making of biryani, curries, and other savory foods. They add a distinct scent and flavour to the food [13].
- 3. Therapeutic characteristics:** According to traditional medicine, *Cinnamomum tamala* contains therapeutic characteristics. The leaves are occasionally utilised in herbal treatments for their potential health benefits, such as digestive and respiratory support [14].
- 4. Culinary Substitute:** While Indian bay leaves resemble bay laurel leaves, they have a different flavour profile. They are frequently used for bay leaves in recipes, but it is crucial to observe the flavour differences [14].
- 5. Cultivation:** The tree is typically grown in tropical and subtropical locations, where it thrives in well-drained soil and warm temperatures. It is grown for both culinary and medicinal use.

When cooking with *Cinnamomum tamala*, it is normal to include the full leaves to the meal and then remove them before serving, as the leaves can be rough and are not typically eaten. In summary, *Cinnamomum tamala*, also known as Indian bay leaf, is a plant with aromatic leaves that are popular in South Asian cuisine due to its particular flavour. It is also used in traditional medicine due to its potential health advantages.



Fig 1: Malabathrum and *Cinnamomum tamala* (Bayleaf) tree

Source

Cinnamomum tamala, often known as Indian bay leaf or Tejpat, is native to the Indian subcontinent. It is mostly found in the Himalayan region, which includes sections of India, Nepal, Bhutan, and Bangladesh. This tree flourishes in the tropical and subtropical climates of these areas.

Cinnamomum tamala can be found in several Indian states, including Himachal Pradesh, Uttarakhand, and Sikkim, as well as other regions with adequate environmental conditions. The tree is commonly cultivated for its fragrant leaves, which are used as a spice in cooking.

In addition to its natural habitat, *Cinnamomum tamala* can be produced in other tropical and subtropical countries with similar weather for culinary and medicinal reasons. Cultivation can also occur in residential gardens or botanical gardens around the world [1].

Cinnamomum tamala or its leaves are available in specialty spice stores, Indian grocery stores and online spice dealers. Furthermore, nurseries or plant suppliers in appropriate climates may sell the plants for growing in home gardens.

Keep in mind that availability varies according to your area and local market. It is always a good idea to check with local suppliers or specialty businesses that sell a wide range of spices and herbs [2].

Taxonomical Classification

Cinnamomum tamala, often known as Indian bay leaf or Tejpat, belongs to the Lauraceae plant family. Here is the taxonomical classification: [3, 4].

Kingdom: Plantae (Plants).

Clade: Tracheophytes (vascular plants).

Order: Laurales.

Clade: Angiosperms (Flowering plants).

Family: Lauraceae.

Genus: *Cinnamomum*.

Species: *Cinnamomum tamala* [4].

Botanical and Morphological Characteristics of *Cinnamomum tamala*

Botanical Characteristics

Family: Lauraceae

Genus: *Cinnamomum*

Species: *Cinnamomum tamala* [5, 6].

Morphological characteristics

1. Habitat

Cinnamomum tamala is an evergreen tree that can reach a height of approximately 20 meters [7].

2. Leaves

- Leaves are simple, alternating, elliptic to ovate in form.
- They are dark green on the upper and paler green on the lower surfaces.
- The leaves have a shiny finish [8].

3. Bark

- When young, the bark is smooth and brown, but becomes rougher and darker brown with age. It has a distinctive scent [7].

4. Flowers

- The flowers are tiny, greenish-yellow in colour.
- They're placed in panicles or clusters.

5. Fruits

- The berry turns dark purple when mature.
- Each fruit normally has a single seed.

6. Aroma and Flavour

- The leaves of *Cinnamomum tamala* have a strong and pleasant fragrance.
- The leaves have a flavour similar to cinnamon and are used as a spice in cooking [8].

7. Distribution

- *Cinnamomum tamala* is indigenous to the Indian subcontinent, specifically India, Nepal, Bhutan, and Bangladesh.

8. Uses

- The leaves are used as a spice in cooking, adding a unique flavour to foods. In traditional medicine, many plant components are employed for their therapeutic characteristics [7, 8].

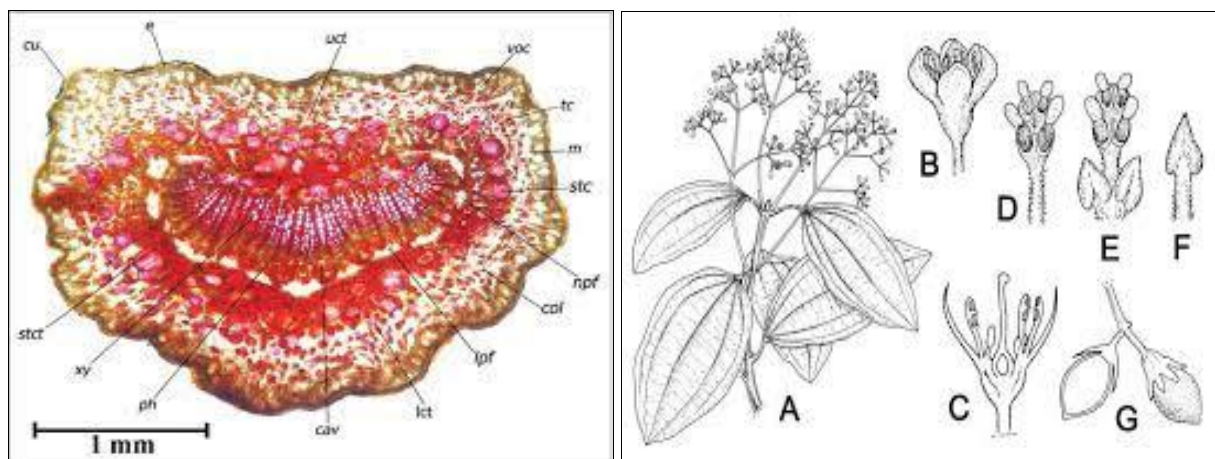


Fig 2: Microscopic characters of leaf of *Cinnamomum tamala* and Miconia Plant

Microscopical Characteristics

Microscopic features are critical for accurate identification and research of plant species. While particular traits may vary, here are some broad microscopic features of *Cinnamomum tamala* [9].

1. Leaf Epidermis

The leaf's epidermis may consist of both upper and bottom layers.

Stomata are present, which allow for gas exchange.

Trichomes (hair-like structures) can be seen on the surface.

2. Leaf Cross-Section

The leaf cross-section may disclose the organisation of several tissue layers.

Oil glands or ducts can be seen, which contribute to the plant's aromatic qualities [9].

3. Vascular Tissues

The arrangement and structure of vascular tissues, such as xylem and phloem, can be investigated in the stem [10].

4. Bark

A microscope can be used to investigate the bark's structure, which includes the existence of cork cells and other tissues [10].

5. Oil cells

Cinnamomum tamala is noted for its aromatic characteristics, and oil cells carrying essential oils contribute to this trait.

6. Tracheids and Vessels

The structure of tracheids and vessels in the xylem may be seen, which helps us understand how water moves throughout the plant.

7. Powdered plant material

Microscopic inspection of powdered plant material, such as dried leaves, can reveal the presence of distinct cells, crystals, and other structures [9].

8. Stem anatomy

Sections of the stem can be studied to determine the organisation of various tissues, such as the cortex, pith, and vascular bundles.

Remember that comprehensive microscopic studies frequently need the use of specialised stains and procedures.

Furthermore, specific traits can vary according on age, climatic conditions, and plant health. If you are undertaking a thorough research, you should consult botanical literature. [10, 11].

The phytochemistry of *Cinnamomum tamala*

Cinnamomum tamala's phytochemistry includes a variety of bioactive chemicals. It's vital to note that the particular composition varies according on geographical region, climate, and cultivation procedures. Here are some important phytochemicals found in *Cinnamomum tamala*:

Essential oils

Cinnamomum tamala leaves yield essential oils rich in fragrant compounds. The essential oil's principal ingredients are cineol (eucalyptol), linalool, terpinolene, sabinene, and methyl eugenol. These chemicals help give the leaves their distinct flavour and scent [24].

Polyphenols

Cinnamomum tamala leaves contain a variety of polyphenolic chemicals, including flavonoids and tannin. These chemicals have antioxidant characteristics and may provide health advantages [24].

Terpenoids

Terpenoids are a wide class of chemicals found in plants that contribute to a variety of biological activities. Terpenoids found in *Cinnamomum tamala* contribute to the plant's therapeutic effects.

Alkaloids

Some alkaloids may also be present in *Cinnamomum tamala*, albeit they are less extensively investigated than other types of chemicals. Phenolic Compounds: *Cinnamomum tamala* is likely to contain phenolic compounds, such as phenolic acid. These chemicals increase the plant's antioxidant potential [23].

Volatile compounds

Cinnamomum tamala's chemical composition may include volatile chemicals in addition to essential oils.

Cinnamomum tamala contains phytochemicals that contribute to its pharmacological effects, which include antioxidant, anti-inflammatory, antibacterial, and other possible health advantages. This plant is frequently used in traditional medicine because to its fragrant and therapeutic characteristics. However, more research is needed to completely comprehend the variety of bioactive chemicals

and their individual impacts on human health.

Phytochemical activity of *Cinnamomum tamala*

Cinnamomum tamala, also known as Indian bay leaf or tejpatta, is a tree indigenous to India and neighbouring countries. It is famous for its fragrant leaves, which are used as a spice in Indian cuisine. *Cinnamomum tamala* leaves contain a variety of compounds, which have been studied for their possible actions [23]. It is crucial to emphasise that, while some research is available, additional studies may be required to completely grasp the scope of these activities. Here are a few of the documented phytochemical activity [17].

1. Antimicrobial Activity

Essential oils derived from *Cinnamomum tamala* leaves exhibit antibacterial properties against a variety of bacteria and fungi. This suggests a possible function in fighting microbial infections.

2. Antioxidant Properties

The leaves are high in antioxidants, such as phenolic compounds and flavonoids. These antioxidants help to neutralise free radicals in the body, potentially lowering oxidative stress and the risk of chronic disease [18].

3. Anti-inflammatory Effects

Some research indicate that *Cinnamomum tamala* extracts may have anti-inflammatory qualities. These actions may be advantageous in situations involving inflammation.

4. Antidiabetic Potential

According to research, *Cinnamomum tamala* may have anti-diabetic properties. It may aid with blood glucose control and insulin sensitivity.

5. Hepatoprotective Activity

Certain research suggest that leaf extracts may have hepatoprotective qualities, which could protect the liver from toxins or other factors.

6. Anticancer Properties

Some studies have looked into the anti-cancer capabilities of *Cinnamomum tamala*. Certain chemicals found in the leaves may have cytotoxic effects on cancer cells.

7. Antihyperlipidemic Effects

There is evidence that *Cinnamomum tamala* extracts may improve lipid metabolism, perhaps lowering high lipid levels in the blood.

6. Antispasmodic and analgesic activities

Cinnamomum tamala has traditionally been used in folk medicine as an analgesic and antispasmodic. This shows that there may be benefits in terms of pain relief and muscular spasm reduction.

It is crucial to highlight that, while these potential activities have been observed in laboratory experiments, more study, including clinical trials, is required to validate these findings and define the right dosage and safety profile for human usage. Furthermore, individual responses may differ, and it is always recommended to contact with a healthcare practitioner before utilising herbal treatments for therapeutic purposes.

Pharmacological effects of *Cinnamomum tamala*

Cinnamomum tamala, often known as Indian bay leaf or

tejpatta, has been investigated for a variety of pharmacological properties. Pharmacological effects are the physiological and biochemical changes that occur in the body as a result of interactions between bioactive chemicals found in plants and biological systems. Here are some of the reported pharmacological effects of *Cinnamomum tamala* [20, 21]:

1. Antimicrobial activity

Cinnamomum tamala extracts exhibit antibacterial and antifungal activities. This suggests that it could play a function in infection prevention or treatment [19].

2. Antioxidant Effects

The plant's antioxidant action is attributed to the presence of phenolic chemicals and flavonoids. Antioxidants protect cells from free radicals and oxidative stress.

3. Anti-inflammatory Properties

Cinnamomum tamala extracts have anti-inflammatory properties, which may be useful in inflammatory diseases.

4. Antidiabetic Activity

According to several research, *Cinnamomum tamala* may help with diabetes by enhancing insulin sensitivity and blood glucose regulation.

The plant has been studied for its hepatoprotective characteristics, which imply that it may play a role in protecting the liver from toxins or other sources of damage

6. Anticancer Potential

Certain chemicals discovered in *Cinnamomum tamala* have been investigated for potential anticancer properties. These chemicals may have cytotoxic effect against cancer cells.

7. Cardioprotective Effects

Some studies suggest that *Cinnamomum tamala* may have cardioprotective effects by regulating lipid metabolism and lowering high cholesterol levels in the blood.

8. Antispasmodic and analgesic properties

Cinnamomum tamala has traditionally been used to relieve pain and muscular spasms.

9. Gastroprotective Effects

Cinnamomum tamala has been studied for its gastroprotective characteristics, which suggest a potential function in gastrointestinal tract protection.

10. Immunomodulatory effects

Evidence suggests that the plant may have immunomodulatory effects, affecting immune system response.

It is crucial to highlight that, while these results have been seen in numerous studies, further research is required to completely understand the mechanisms of action, ideal dose, and potential negative effects of using *Cinnamomum tamala* medicinally. Furthermore, individual responses may differ, so it's best to speak with a healthcare practitioner before introducing herbal therapies into a treatment plan.

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