



# A BASIC PHARMACOLOGICAL ACTION OF TOONA CILIATA PLANT

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## ABSTRACT:

Toona ciliata Roem. Var. ciliata is a timber tree that is used in the production of timber, ornamental sculpture, tanning leather, dye to colour silk, and many more things. It is a member of the Meliaceae family. It has 15 species, which are mostly found in tropical areas. Cedrela toona roxb is another name for it. It is also widely used as folk medicine for fever, ringworm, menstrual disturbances, cancer, ulcers, dysentery, leprosy, and as an astringent, expectorant, tonic, anthelmintic, and aphrodisiac. Due to the presence of toonacilin, siderin, deoxycedrelone, leucoanthocyanidin, deoxycedrelone, sesquiterpene, limonoids (toonaciliatins), and many more phytoconstituents, researchers have proven many pharmacological activities like anti-diabetic, anti-feedant, anti-oxidant, anti-inflammatory, etc. Toona ciliata's phytochemistry and pharmacology are thoroughly examined in this review in an effort to suggest areas for further study.

Keywords: toona ciliata, cedrela roxb, meliaceace

## INTRODUCTION

Traditional societies all around the world employ medicinal plants and their derivatives extensively, and they are becoming more and more well-liked in contemporary society as healthy substitutes for synthetic chemicals. (Ben-Erik Vanwyk et al., 2009). Nearly 60% of people on the planet use traditional medicines. These have long been used for primary healthcare in developing countries and isolated communities. (R.N. Chopra et al., 1986)

*Toona ciliata* Roem. var. *ciliata* (Meliaceae), a tropical Asian wood tree, is mostly found in India, Malaysia, Indonesia, and southern China (Chen, S. K. et al., 1997; Wu, C. Y. et al., 1984). *Toona* (Meliaceae family) has 15 different species, the majority of which are found in tropical regions of Asia and Africa. It is also referred to as "Cedrela" as a result of the fragrant wood.

## TRADITIONAL USES

It is a timber tree with coloured wood that is widely cultivated throughout the tropics for timber production as well as as an ornamental or roadside tree. Its wood hearts, famously known as Chinese mahogany cedar, are perfectly suitable for architecture, furniture, interior decoration, and sculpture. Tanning leather from its bark is possible (Chen, S. K. et al., 1997), and the flowers provide a reddish or yellowish dye to colour silk. (Kumar et al., 2012)

It has long been employed to create twine and string bags. It is used in food and traditional medicine to remove heat and moisture. (Loupee D, et al., 2008) (Y. Wang et al. 2010) the market sells a product with the Ayurvedic name Nyagrodhadi Kvatha Curna. (Ayurvedic pharmacopeia)

In Chinese folk medicine, the bark has been used to cure dysentery, fever, ringworm, and menstrual disturbances. Chinese Materia Medica ( Zhonghua Benchao et al., 1999)

Its leaves, stems, and seeds have historically been used to treat a variety of conditions, including cancer, ulcers, dysentery, and leprosy (Kumar, et al., 2012).

Bark is astringent, expectorant, tonic, anthelmintic, aphrodisiac, and antiperiodic. It is also bitter and caustic. [Warrier P.K et al., 1996].

It treats fever, headache, and blood problems (according to Ayurveda), is cardiogenic, aphrodisiac, and anthelmintic, and is effective against scabies and as an expectorant. (Yunani) (Kiritikar KR et al.,1995)

## MORPHOLOGY OF PLANT

A medium-sized to large deciduous and evergreen tree, Roxb Cedrela toona can grow as high as (25-35 m). 20 to 40 cm long panicle. 5- to 6-mm-long white petals. wings on both ends, ellipsoid-shaped, 10–20 mm long, and 6–8 mm in diameter. It has a scaly, brown to grey bark. It has a petiole that is 4-11 cm long and petiolules that are 5-12 mm long. Its leaves are 15-45 cm long, typically paripinnate but occasionally have a terminal leaflet in sophomoric growth. Leaflets are mostly 8-20, ovate, often falcate, 4-15 cm long, 15-50 mm wide, with an acuminate apex, a base that is strongly asymmetric. (Loupee D et al.,2008, Khare,C.P et al., 2006,Sunil Kumar et al.,2012, Kashyap K, et al.,2006)

## TAXONOMICAL CLASSIFICATION

The taxonomical classification of the plant has been mentioned given below. (Kumar, et al., 2012)

KINGDOM	Plantae
DIVISION	Magnoliophyta – Flowering plant
UNRANKED	Angiosperm
ORDER	Sapindales
FAMILY	Meliaceae
GENUS	Toona Roem.
SPECIES	Toona ciliata

## PHYTOCONSTITUTE

Toona ciliata has wide range of chemical constitute which consist multiple activity Cedrelone , a tetra nortriterpenoid,(Sharma P et al.,2009,Gopalakrishnan Get al.,2000) isolated from the benzene extract of the heartwood of the Cedrela toona Roxb,[Hodges R et al.,1963, Karus Wet al.,1987,Karus W et al.,1981]., toonacilin,toonafolin(tetranortriterpenoid  $\beta$  lactone)(Karus W et al.,1981), 6-acetoxy toonacilin, toonacilid, geranyl geraniol,  $\delta$ cadinene, calamenene,  $\alpha$ -calacorene, siderin(natural coumarin)(Veiga TA et al.,2007), deoxycedrelone, sesquiterpene, limonoids (toonaciliatins), cycloartene ,stigmasterol, campesterol, apotirucallene, 5-methylcoumarin,tirucallene, catechin, proanthocyanidin, leucoanthocyanidin.(Da Saliva M,etal.,1999,Lio S-G et al., 2007,Chaudhary R. et al.,2004)

## PHARMACOLOGICAL ACTIVITIES

Toona ciliata has traditional use but also some activity of this plant is proved pharmacologically by researchers some are given below

**ANTI MICROBIAL ACTIVITY:** Toona ciliata (stem bark) extracts and siderin, a key coumarin in T. ciliata, had good in antibacterial activity in vitro and a weak antifungal impact.(rashederrzaman et .al 2002, Chowdhary R,et al. 2003)

Inhibitory activity was observed against Bacillus subtilis, Staphylococcus aureus, Salmonella setubal, and Micrococcus luteus with in chloroform extract of the toona ciliata plant's leaves. (Bibi Y et al., 2011)

**ANTI FUNGAL ACTIVITY:** Toona ciliata extract seems to have little antifungal activity. (rashederrzamanet. al 2002, Govindachari T R et al., 2000)

**ANTIOXIDANT ACTIVITY:** The antioxidant properties of Toona ciliata leaf and flower extracts was conducted using a variety of solvents, including petroleum ether, chloroform, ethyl acetate, and methanol. According to the findings, all of the extracts significantly outperformed the standard, BHT(butylatedhydroxytoluene), in terms of their ability to scavenge DPPH and ABTS radicals. ( Hemayet Hossain,et al., 2014)

Using the 2,2 - Diphenyl - 1 - Picrylhydrazyl (DPPH) free radical scavenging assay, the hydrogen peroxide scavenging assay, and the reducing power assay, the antioxidant activity of the samples was assessed..(V. Vinodhini et al.,2014)

Aqueous, acetone, and methanol extracts of the leaf of the *Toona ciliata* plant all exhibit antioxidant activity with IC50 values of 4.645, 4.508, and 4.097 g/ml, respectively.(Sharma P, et al.,2009)

**ANALGESIC ACTIVITY :** Using the Hot plate method and the Tail immersion method, the analgesic activity of *Toona ciliata* was assessed. The heartwood of the plant's ethanolic extract significantly increased the latency time when using the hot plate method, and it also significantly increased the tail withdrawal reflex time when using the tail immersion method. Bergapten, which may be the source of the narcotic analgesic activity, is present in *Toona ciliata*. The plant's common steroids are also accountable for the plant's analgesic effects.(Malairajan P, et al.,2007)

**ANTI INFLAMMATORY ACTIVITY:** Histamine acts as an inflammation mediator. (Cuman RKN et al., 2001)The region where the wheal develops shrinks when histamine receptor function is inhibited by certain substances. This might be the case because the *toona ciliata* extract's anti-histamine action supports its anti-inflammatory effects. With greater extract concentration, the extract's antihistaminic impact becomes more pronounced. The extract significantly reduces the generation of oedema by histamine by inhibiting the inflammatory mediators' synthesis and activation.(Hemayet Hossain,et al.,2014)

**ANTI ULCER ACTIVITY:** The anti-ulcer activity of the *Toona ciliata* was evaluated against aspirin plus pylorus ligation-induced gastric ulcer (antisecretory), HCl – ethanol-induced ulcer (cytoprotective), and water immersion stress induced in rats. Ethanol extract of heartwood of the *Toona ciliata* showed a significant reduction in gastric volume, free acidity, total acidity, and ulcer index. The plant extract showed gastro-protective activity (52.94%) and also showed a protection index of 43.0% in water immersion stress-induced ulcers. Preliminary phytochemical investigation of the ethanol extract of heartwood showed a positive test for sterols and terpenoids, hence the anti-ulcer activity of the extract of the plant may be due to the presence of the steroids and terpenoids.(Malairajan P, et al.,2007))

**CYTOTOXICITY ACTIVITY:** The major isolate, siderin, isolated from the petroleum ether extract of the plant was found to have significant cytotoxicity in the brine shrimp lethality bioassay. [33] Polyynes, i.e., (3R, 8E, 10S)-heptadec-8-ene-4,6-diyne-3,10-diol, isolated from the ethyl acetate extract of the leaves of *Toona ciliata*, exhibited potent cytotoxicity against the HL-60 cell lines. (Ning J, et al., 2011)

**ANTI FEEDANT ACTIVITY:** Cedrelone, a tetranortriterpenoid isolated from the heartwood of *Cedrela toona*, produces a true photooxidation product 3 [14, 15, 22, 23-diepoxy-6-hydroxy-6-hydroxy-1,5, 20(22)-meliatriene-2,7,21-trione], as well as product 4 [14, 15-epoxy-6,23-dihydroxy-1,5; 20(22)-meliatriene-2]. Both of these products exhibited anti-feedant activity. (Gopalakrishnan G, et al., 2000)

**ANTITUMOR ACTIVITY:** A new hydroxysteroidal ketone, 12 $\alpha$ -hydroxystigmast-4-en-3-one, isolated from the petroleum ether extract of *Toona ciliata*, showed significant antitumor activity with a  $Ti_{50}$  value of 14.1 micrograms/ml in a potato disc bioassay. (Chowdhary R et al., 2003)

**ANTI DIABETIC ACTIVITY:** Antihyperglycemic activity of the leaves of *Toona ciliata* hydroalcoholic extract in streptozotocin-induced diabetic rats. The effects of oral administration of *T. ciliata* leaf extract (0.2–0.4 g/kg body weight) for 15 days on the levels of blood glucose, serum cholesterol, triglycerides, urea, creatinine, aspartate amino transferase (AST), and alanine amino transferase (ALT) in normal and streptozotocin-induced diabetic rats were evaluated. (Monika Rana et al., 2016)

**ANTI HYPERLIPIDEMIC ACTIVITY:** Fruit extracts of *Cedrela toona* Roxb. were evaluated for their antihyperlipidemic effect in Swiss albino female rats. A high-cholesterol diet was prepared by mixing cholesterol (2%), sodium cholate (1%), and coconut oil (2% or 30%) with standard powdered animal food. (Shah Kinjal H et al., 2012)

**ANTI DEPRESSANT ACTIVITY:** The antidepressant-like effect of essential oil isolated from *T. ciliata* Roem. var. *yunnanensis*. Gas chromatography and mass spectrometry (GC–MS) were used to analyze the compositions of essential oils. The immobility times in the forced swimming test (FST), tail suspending test (TST), and open field test (OFT) were used to evaluate the anti-depressive effects of essential oils. (Dongmai duan et al., 2014)

## CONCLUSION

As we have seen, *toona ciliata* has been used at the deepest level as a remedy for a variety of illnesses. Furthermore, numerous investigations employing animal experiments have shown that it has uses in addition to those related to ethnomedicine. The medicinal effects of herbs on many different ailments appear to be very diverse. Numerous plant parts have been studied for their anti-inflammatory, analgesic, anti-feedant, anti-diabetic, ulcer-healing, cytotoxic, antidepressant, and other properties.

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