

Study of Bark of Tectona Grandis: A Detailed Review

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Abstract: The use of plants as medicines has a long history in the treatment of various diseases. The earliest known records for the use of plants as drugs are from Mesopotamia in 2600 B.C., and these still are a significant part of traditional medicine and herbal remedies. To date, 35,000-70,000 plant species have been screened for their medicinal use. Several important drugs such as Taxol®, camptothecin, morphine and quinine have been isolated from plant sources. The first two are widely used as anticancer drugs, while the remaining are analgesic and antimalarial agents, respectively. In this paper review of literature survey of *T. grandis* Linn are explored in detail.

Key Words: Tectona Grandis medicinal use, bark, root.

Introduction:

Phytochemistry of Tectonagrandis:

Scientific name : Tectonagrandis Linn Family : Verbenaceae

English Name : Teak Hindi Name : Sagon, Sagwan

According to Ayurveda, wood is laxative and useful in treatment of piles, leucoderma and dysentery. Bark is useful in scabies and as an astringent in bronchitis¹. Methanol extract of flowers shows antidiabetic² and antioxidant activity.

Literature reveals isolation of some naphthoquinones and anthraquinones. Viz, lapachol³ (I), a-lapachone (II), tectograndone⁴ (III), tecomaquinone-I⁵ (IV) from roots and heartwood are shown in figure 1-4.

Traditional uses of Tectonagrandis. linn

Wood: Sedative, Anthelmintic, piles, in the treatment of gravid uterus, Leucoderma, dysentery, headache, burning pain over liver region, antiinflammatory, anodyne, vermifuge, ophthalmic, depurative, laxative, vitiated conditions of pitta&kapha, neuralgia, arthritis, dyspepsia, flatulence, cough, skin diseases, leprosy, hyperacidity, menorrhagia, leucorrhoea, abortion, hemorrhoids, antibilious and lipid disorders. Paste made from the wood is used as a diuretic, stimulant, hepatic, astringent, relief from tooth ache. Wood ash is applied to the swollen eyelids to strengthen the eye sight. Oily product obtained from the wood chips applied to eczema⁶⁻¹⁰.

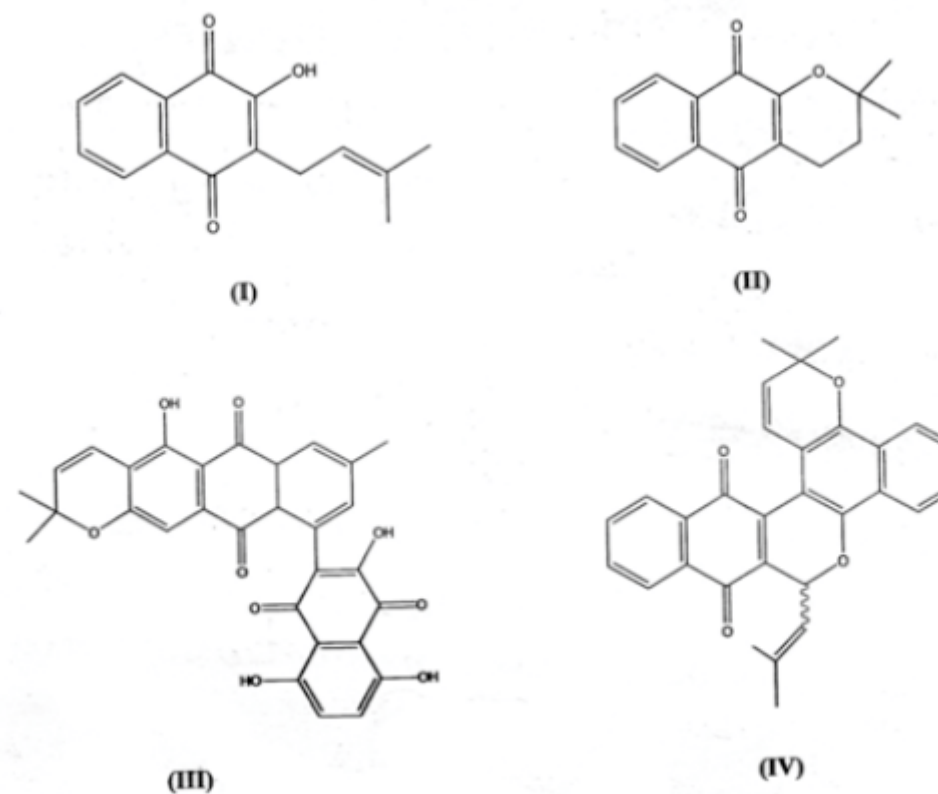


FIGURE 1-4

Root: In the treatment of anuria, urine retention.

Leaves: Used for thatching, haemostatic, depurative, antiinflammatory, vulnery, leprosy, skin diseases, puritus, stomatities, indolent ulcers, hemorrhages, Haemoptysis, vitiated conditions of pitta.

Seed: Diuretic, emollient, demulcent, skin diseases, prurities and in vitiated conditions of vata. Oil obtained from seeds promotes the growth of hair and is useful in eczema, ringworm and to check scabies.

Bark: Bronchitis, Constipation, Anthelmintic, Depurative, hyperacidity, dysentery, verminosis, burning sensation, diabetes, leprosy, skin diseases, leucoderma, headache, piles, laxative, expectorant, anti-inflammatory, indigestion, expels worms from the body and in vitiated

conditions of pitta. Flowers: Bronchitis, biliousness, urinary discharge, diuretic, depurative, anti-inflammatory, burning sensation, dipsia, leprosy, skin diseases, strangury diabetes and vitiated conditions of pitta and kapha.

Flowers: Oil obtained from the flowers promotes growth of hair and useful in scabies, eczema. Infusion of flowers is taken in congestion of liver.

Fruits: Diuretic, demulcent, strangury, vesicle calculi, pruritus,

REVIEW OF BARK OF *TECTONA GRANDIS*

Although teak has been grown in plantation conditions for one hundred and fifty years, the high value of teak timber due to its appearance and mechanical properties, the strong markets for teak products combined with increased distance to and declining stocks from natural stands have attracted increasing attention to the potential of teak plantations as an investment with an attractive return in the last decade. Such interest is not new; one of the early bodies established as a subsidiary of the FAO Asia-Pacific Forestry Commission in the 1950s was the "Teak sub-commission" with eleven member countries. Its aims, which were similar to those of the present TEAKNET, were to promote international collaboration in the study of all scientific, technical and economic aspects relating to teak and the issues discussed in those days were remarkably similar to those of today. This paper examines trends in the establishment of teak plantations worldwide and identifies some of the environmental and economic issues and challenges for investors in these programmes.

Tectonagrandis Linn. is a widespread hard wood plant used for both therapeutic and commercial purposes. It is native to South and Southeast Asia. The present study was carried out to investigate analgesic and anti-inflammatory activities of *T. grandis* (Family Verbenaceae) stem bark extracts and also determined the preliminary phytochemical screening and acute toxicity of the stem bark extract. Stem bark was extracted with ethanol (TGEE) and water (TGAE). Analgesic and anti-inflammatory activities of these extracts were assessed in Wistar rats with hot plate test and carrageenan induced paw oedema model. At the doses used (200, 300 and 500 mg/kg), TGEE and TGAE showed significant and dose-dependent analgesic and anti-inflammatory effects. The

phytochemical analysis revealed the presence of flavonoids, alkaloids tannins, anthraquinones, saponins, carbohydrates and proteins. None of the extracts had acute toxicity activity up to 2000 mg/kg dose level. The TGEE and TGAE exhibited significant analgesic and anti-inflammatory activities of *T. grandis* stem bark due to the presence of various phytoconstituents such as flavonoids, alkaloids, tannins, anthraquinones and saponins¹¹.

The effect of *plumbagozeylanica* roots on learning and memory of mice has been investigated. The exteroceptive behaviour model (Elevated plus maze and Passive avoidance paradigm) and interoceptive behaviour model i.e. scopolamine induced amnesia were employed to evaluate the effect of *Plumbagozeylanica* roots on learning and memory of mice. The *Plumbagozeylanica* at dose 200mg/kg has shown promising memory enhancing effect in mice. Furthermore, the extract significantly reversed the amnesia induced by scopolamine (0.4mg/kg i.p.). The reversal of scopolamine induced amnesia may be due to facilitation of cholinergic transmission in mice brain¹².

Tectonagrandis Linn. (saag - tick wood), an indigenous medicinal plant, has a folk reputation among the Indian herbs as a hypoglycemic agent. The present study was carried out to evaluate the anti-hyperglycemic effect of *T. grandis* Linn. bark extract in control and alloxan-diabetic rats. Oral administration of the bark suspension of *T. grandis* (2.5 and 5 g/kg body wt.) for 30 days resulted in a significant reduction in blood glucose (from 250 ± 6.5 to 50 ± 2.5 mg/dL). Thus, the present study clearly shows that the *T. grandis* Linn. bark extract exerts anti-hyperglycemic activity¹³.

The phytochemical investigation of the bark of *Tectonagrandis* Linn. afforded a new steroidal glycoside identified as beta-sitosterol-beta-D-[4'-linolenyl-6'-(tridecan-4'''-one-1'''-oxy)] glucuranopyranoside and three new fatty esters, 7'-hydroxy-n-octacosanoyl n-decanoate, 20'-hydroxy eicosanyllinolenate and 18'-hydroxy n-hexacosanyl n-decanoate, along with the known compounds n-docosane, lup-20(29)-en-3beta-ol, betulinic acid and stigmast-5-en-3-O-beta-D-glucopyranoside. Their stereo structures have been elucidated on the basis of spectral data analyses and chemical reactions¹⁴.

In the review¹⁵ the methanolic and petroleum ether extracts of *Tectonagrandis* seeds were evaluated for anti-inflammatory activity using paracetamol. The conclusion of this study showed significant and dose dependent hepatoprotective activity which proved the hepatoprotective potential of *Tectonagrandis* seeds.

In the study of the review¹⁶ the standardization of *Tectonagrandis* by using pharmacognostic and phytochemical investigation on stem bark of *Tectonagrandis*. This study reveals qualitative phytochemical screening of *Tectonagrandis* bark extracts.

The review¹⁷ says that a provenance trial in teak involving seven provenances from Kerala was conducted during the period from June 1995 to January 1997, Germination behavior of seeds in the nursery was not significantly influenced by the provenances height and tap root length means were largest in the seedlings at the final internal.

The study of the review¹⁸ says that Diuretic is any substance which increases the urine and solute excretion Aqueous extract of *Tectonagrandis* revealed the presence of phenolic compounds, carbohydrates, thus aqueous extract of *tectonagrandis* was selected for scientific base of its diuretic evaluation. Phytochemical investigation revealed the presence of phenolic compounds, carbohydrates saponins, tannins and flavonoids are constituents of aqueous extract of *tectonagrandis*.

In the paper¹⁹ wound healing activity of different extracts of *Tectonagrandis* was evaluated using Sprague dwaly rats. This paper concludes that the polar extracts i.e. methanolic and aqueous extracts in hydrophobic bases showed significant activity when compared to non polar extracts i.e. petroleum ether, ethyl acetate and chloroform extract did not show significant study. This paper concludes scientific support to the folkloric accounts to the use of the frontal leaves of *Tectonagrandis* in the treatment of wounds.

In the review²⁰ Bronchial asthma is a chronic inflammatory disease, characterized by both bronchoconstriction and airway inflammation. The result of this paper indicated that ethyl acetate extract of *Tectonagrandis* bark show significant anti-asthmatic activity. The anti-asthmatic activity of ethyl acetate extract can be attributed to stabilize the most cell.

Study of paper²¹ reveals that *Tectoagrandis* is a widespread heart wood plant used for both therapeutic and commercial purposes. The phytochemical analysis revealed the presence of flavanoids alkaloids, tannins, anthraquinones, saponine, proteins etc. Extraction of ethyl alcohol exhibited significant analgesic and anti-inflammatory activities of *T. grandis* stem bark due to presence of various phytoconstituents such as flavanoids, alkaloids, tannins, anthraquinones and saponins.

In the review²² it is revealed that used in treatment of diabetes. In this paper it is studied the effect of ethanol extract of *Tectonagrandis* in treatment of diabetes mellitus and associated cardiovascular complications in alloxan induced diabetic rats. Effect of *Tectonagrandis* on various biochemical, hemodynamic were observed. The result obtained in the present study indicate that *Tectonagrandis* may present the cardiac dysfunction in alloxan induced diabetic rats.

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