IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

A Comprehensive review on Evaluation of various Pharmacological activities of Tactona grandis Linn Root

[1]Veeresh Kumar Rathour,[2] Dr. S.D. Singh,

[1] M. Pharm Pharmacology Research Scholar MAHATMA JYOTIBA PHULE ROHILKHAND UNIVERSITY BAREILLY,[2] Associate Professor Dept of Pharmacology Faculty of Pharmacy MAHATMA JYOTIBA PHULE ROHILKHAND UNIVERSITY BAREILLY,
[1] MAHATMA JYOTIBA PHULE ROHILKHAND UNIVERSITY BAREILLY, U.P

Abstract: One of the most famous timbers in the world and noted for its dimensional stability is Tectona grandis Linn, sometimes known as teak or sagwan. One of the most common invasive species in tropical areas is teak. India and other south Asian nations are frequent locations for it. Many traditional medications also use teak as a key ingredient. Its medicinal properties include antibacterial, antioxidant, antifungal, anti-inflammatory, anti-pyretic, analgesic, and anti-diuretic, anxiolytic and anti-convulsant activities. Additional research reveals the presence of Tannic acid, Caffeic acid, Gallic acid, Ferulic acid especially in root. Teak extracts of roots can be utilized for anxiolytic an anticonvulsant activity. Its therapeutic benefits are acknowledged by the Ayurveda, Unani and Siddha medical system. So in this review our focus was on Evaluation of anxiolytic and anticonvulsant evaluation studies of methanolic extract of Tactona grandis Linn Root.

Keywords: - Tactona grandis Linn, anxiolytic, Tannic acid, Caffeic acid, Gallic acid, HPLC

I. INTRODUCTION

Herbal remedies refer to use of any portion of plant for aim of curing treating ailments. “Herbal remedies have been used extensively throughout human history, with [1]. Furthermore, more than 35,000 plant species have been recorded to be employed for medicinal reasons in diverse human societies across world”[2]. Antimicrobial, anti-diabetic, anti-epilepsy, antiviral, anticancer and antifungal properties are present in some of them.

Epilepsy is a state of constant, repeating seizures and the epileptic conditions are a heterogeneous gathering of problems with various clinical signs. The instruments fundamental epileptogenesis are not sufficiently perceived, albeit the etiologic of human epilepsy has been a subject of serious examination for a long time. Among the most handicapping parts of epilepsy is the expectation of seizures - the vulnerability of when and where the following seizure will happen. Not at all like problems, for example, Parkinson's or Alzheimer's illness, patients with epilepsy as a rule seems typical and capability regularly for a significant part of the time. These two coinciding states - evident typical and an unexpected, discontinuous pathologic condition-infuse unique hardships into our capacity to comprehend and treat epileptic seizures. Thought of a portion of the essential neuro-physiological elements that impact seizure event gives understanding into this duality While fundamental researchers presently have a few general thoughts regarding the neuronal systems that are probably going to be related with seizures, there is practically no data from trial labs that assistance to foresee how, when and why a seizure begins (maybe with the somewhat intriguing exemptions of the reflex epilepsies).[3] As a matter of fact, in the research facility, "genuine" epilepsy will in general be characterized as that which happens "immediately" and we search out creature models and cell frameworks in which seizures happen without obvious incitement. All clinicians realize that all seizures are not appearances of epilepsy. Essentially, encountering a seizure doesn't imply that the mind is fundamentally epileptic. Ongoing epilepsy should be figured out regarding particular loss of specific neuronal populaces and synapses and plastic transformations to those changes. Neuronal plasticity in wellbeing and illness is represented by proteins, second courier frameworks and, at last, qualities are the primary driver of epilepsy.[4] Various reason for epileptics are Altered neurotransmission and synaptic plasticity which may be due to Loss of GAbAergic inhibition Functional (and structural) disconnections of GAbA circuits. Among the various factors for epilepsy, increased oxidative stress i.e. increased production of free radicals is the main cause of the disorder. Usually free radicals having unpaired electrons their valance shells are usually very-very reactive in nature.(5) When these radicals reacted with O_2, donate their unpaired electrons to the molecular oxygen which leads to formation of new free radicals. Negative charge on oxygen leads to very reactive oxygen species, also known as R.O.S. in short. R.O.S. consist family of free radicals of oxygen moiety i.e. superoxide, hydroxyl and per hydroxyl. These free radical frequently damage surrounding tissue and their products.[6]

This damaging property is known as oxidative damage, and all the substances which provide protection against radicals are known as antioxidants. Factors associated with the formation of these radicals include tobacco smoking, excessive use of xenobiotics and drugs, pollution and. inflammation in the body leading to the production of free radicals. These free radical produce irregulation in oxidative phosphorylation altering the activity of complex 4 in e.g. chain of cellular respiration in mitochondria. and irregulation in oxidative

phosphorylation of cell resp. in "mitochondria" in which alteration activity in complex 4 of the electron transport chains.[7] Damaging property of free radicals include disruption in myelin sheath in neurons, DNA damage, damage in lipid bi-layer of unsaturated fatty acids and plasma lipoproteins which leads to formation of high level of peroxides, dialdhydes and also leads to disruption in tertiary and quaternary structure of proteins and other molecules. It may also cause mutations, cancer, autoimmune diseases and atherosclerosis. Over production of free radicals also causes apoptosis of the neuronal cells.

A coordinated experimental design is very much important for the understanding of epileptic networks and allows developing new concepts for rational drug design. Although much progress has been made in the analysis of human surgical specimens, such studies are usually restricted to a late stage of the disease and must take into account different clinical histories of patients as well as lack of appropriate control material. In this respect, animal models provide important adjunct tools to address basic mechanisms of focal epileptogenesis as well as antiepileptic drug (AED) treatment/resistance [8]. The tremendous diversity of available animal models offers both opportunity and challenge. Studies on animal models of epilepsy have contributed greatly in understanding the aetiology and etiopathogenesis of the disease. There are many advantages of using animal model in research work on epilepsy as the aetiology, pathogenesis of the disease and its complication can be clearly understood. It also helps in the development and evaluation of newer agents for the treatment of epilepsy. [9] The ideal ant seizure drug would suppress all seizures without causing any unwanted effects. Most of the drugs used for treating epilepsy were discovered accidentally. Long-term use of these drugs leads to different adverse side effects. The use of herbal therapies is on the rise in the world now a days. Although from ancient times different indigenous plants are used for therapeutic management, yet little information is available regarding their mode of action. India with topical and humid climate and with varied topographical and climatological conditions is a storehouse of herbal plants. Lessons of Ayurveda medicine from history have come down to generations of recent past with specific ailments. In fact human beings in their early life were fully dependent on the green plants for curing different body disorders and diseases. India has a rich source of plants and those plants are being used for centuries for medicinal purposeq2. [10]

PLANT PROFILE

Tectona grandis

2.2.1Plant monograph

Bi-nominal Name: *Tectona grandis*

Family: Verbenaceae

Vernacular Names (Synonyms):
English: Teak;
Indian Oak.
Hindi: Sagon, Sagwan.
Marathi: Sag.
Malayalam: Theka or tekka.

***Tectona grandis* Linn.**

Plants have very unique property is that it loses its leaves every autumn. Height is in between 4 -400 meters, with a trunk of radius of about 105cm. Size of leaves is about 3-5 inches and having serrated margins. Petiole is about 2.5cm in length.Leaves were collected and washed in running water to remove the dust particle, soil and their unwanted substances. Leaves of Tectona grandis were shade dried for 4 weeks to remove all of the moisture content and to preserve maximum of the bioactive compounds which may get denatured or transformed by light. The dried material was grinded and fine powder was packed in air tight bottle. Flower of TG having shade pink color. [11]They have five petals upto 5cm diameter. TG flower turns into fruits after 7-8 months and fruit mature in season of autumn, in real means, seeds of TFG consist two parts i.e. external frame and rigid shield contain seed ("cottage"). (14) For more than 2,000 years, India has made extensive use of teak. The Malayalam word tkka is where the term teak originates. The tree, which is indigenous to India, Myanmar (Burma), and Thailand, may be found in much of this region up to roughly the 25th parallel, but in the Punjab it can be found up to the 32nd parallel. The most profitable woods are on low slopes up to around 900 meters, not close to the ocean, where the tree is found (3,000 feet). In the Malay Archipelago, stands may also be found in the Philippines, Java, and other islands. Africa, Central America, and South America are also home to teak plantations. [12]

RESEARCH METHODOLOGY

The databases that are utilised to find published data include well-known search engines like Scopus, Pub Med, Science Direct, Web of Science, and Google Scholar. Tectona grandis L.f., Phytochemical, biological activity, toxicity, allergy, phytoconstituents, HPLC, UV, and IR GC-MS were among the different search phrases utilised as key words. The titles and abstracts of the connected papers were found and checked. Title, authors, journal, and year of publication were all included in the data extraction. Full texts of related

articles were located and verified before being added to the review. All the significant facets of the plant under evaluation were the focus of this investigation. This review includes articles that discussed pharmacology, phytoconstituents, allergies, and toxicology.

Table 1 provides a list of certain phytoconstituents and their methods of identification and measurement.

S. No	Part (Solvent extract)	Phytoconstituents	Chemical class	Technique	Reference
1.	Stem bark (Methanol)	Betulin	Tripernoid	HPLC	P.A. Singh et al Int, J. Pharma. Sci. Res., 7 (2) (2016), pp. 1-8
2.	**Roots (Methanol)**	**Tannic acid, Caffeic acid, Gallic acid, Ferulic acid**	**Phenolic acid**	**HPLC**	**Shalini et al J. Environ. Agri. Food Chem., 8 (4) (2009), pp. 218-229**
3.	Leaves(Methanol)	Sinapic, gallic p-hydroxybenzoic acid, ferulic acid, chlorgenic, cinnamic, vannilic acids	Phenolic compounds	RP-HPLC	G. Murukan, et al Asian J. Pharm. Res., 11 (1) (2018), p. 60

Table 1. Phytochemical profile of TG.

Biological activities of Tectona grandis L.f (non-patent literature)

Since the beginning of time, the herb has been utilised by traditional healers. Some of the traditional remedies listed in the literature include those that are laxatives, sedatives, used to cure piles, diarrhoea, leukoderma, and anti-inflammatory drugs for bronchitis, urinary tract infections, liver problems, hair growth, and scabies. Additionally, it has expectorant and anthelmintic effects (Deepali et al., 2010a, Kruger and Schulz, 2007, Nayeem and Karvekar, 2011a, Nayeem and Karvekar, 2011b). Review details many biological functions of the target plant both in vitro and in vivo (Singh et al., 1996, Ramesh and Mahalakshmi, 2014). Different sick illnesses are treated using isolated extracts from diverse plant sections, either alone or in conjunction with other extracts. Naphthaquinone (anti-ulcerogenic), benzene-1-carboxylic acid-2-hexadeconate (antiviral), lapachol (anti-tumour), 4′,5′-dihydroxy epi-isocatalapachol (anti-fungal), and 5,8-dihydroxy-2-methyl anthraquinone (anti-plasmodia) are some of the active components identified for the therapeutic activities (Vyas et al., 2019, Goswami et al., 2009).

Pharmacological Activities

Anti-bacterial activity

Study of Tectona grandis's leaves and fruits Linn exhibits antimicrobial properties. Tectona grandis fruit. Quinolones and triterpenes, two chemical components of Linn, are what give the fruit its antibacterial properties. the Tectona grandis crude ethanolic extract. Linn has strong antibacterial action. With a MIC of 16 g/ml, the isolated chemical 6-methyl-1,4-dihydroxy anthraquinones has potent anti-Escherichia aerogenes action. With a MIC of 32 g/ml, the fruit's methanolic extract also exhibits modest activity versus Escherichia choli. The antibacterial action of the fruit extract of Tectona grandis is mostly due to 3 isolated compounds: 6-methyl-1,4-dihydroxyanthraquinone, 2-hydroxyursolic acid, and tectograndone. Linn [19]

Anti-inflammatory activity

Inflammation is generally known to be caused by protein denaturation. The Tectona grandis extracts. Significant antiproteinase activity is shown in Linn. Tectona grandis extract in methanol. Linn displays the most inhibition. The strongest proteinase inhibitory efficacy compared to water extract is shown by the methanolic and ethanolic extracts. The maximal inhibitory activity of the common medicine aspirin was around 92.83%, whereas that of methanolic and ethanolic extracts was approximately 83.90% and 81.17%, respectively. The solvent portion has a mild xanthine oxidase inhibitory effect, making it useful for treating disorders caused by the enzyme. Thus, Tectona grandis extract. Linn can be utilised to create an effective anti-inflammatory drug and to treat a variety of illnesses, including biliousness, hyperacidity, dysentery, diabetes, leprosy, and inflammatory disorders. [20]

Wound healing

Tectona grandis' capacity to treat wounds. Rats used an excision wound model to study Linn leaf extract. This study demonstrates that Tectona grandis 5% ointment. Within 4 days, Linn leaf extract reduced the size of the wound. According to this study, the wound area decreased significantly after 8 days. Similarly, Tectona grandis 10% ointment. When compared to control, Linn leaf extract in the wound region revealed a decline starting from day 4 forward. [21]

IV. RESULTS AND DISCUSSION

Tectona grandis. The information above demonstrates that Linn is one of the most significant medicinal plants. Today, more and more patients are being treated for a wide range of disorders using herbal therapy. This analysis emphasizes the little-known and crucial activity of the plant Tectona grandis in terms of anxiolytic and anticonvulsant evaluation studies. The extracts of this plant's sections have already been the subject of several researches, which demonstrate the existence of various chemical components and their biological effects. This review can be utilized to continue the creation of novel medicines that can be used to cure illnesses. Utilizing plants for treatment enables patients to avoid the adverse effects that medications might have. Therefore, it is crucial to understand the diverse anxiolytic activity of various medicinal plants. Some of the significant Tectona grandis Evaluation of anxiolytic and anticonvulsant evaluation studies of methanolic extract of Tactona grandis Linn Root actions are discussed in this article. It will be beneficial to anyone researching Tectona grandis. Linn.

II. ACKNOWLEDGMENT

I am grateful to my supervisor and Department of Pharmacy M. J. P. Rohilkhand University

Declaration of Interest

The authors affirm that they have no known financial or interpersonal conflicts that would have seemed to have an impact on the research presented in this study.

.

REFERENCES

1. Nidavani, Ramesh B., and A. M. Mahalakshmi. "Pharmacology of Tectona grandis Linn.: short review." International Journal of Pharmacognosy and Phytochemical Research 6.1 (2014): 86-90.
2. Nidavani, Ramesh B., and A. M. Mahalakshmi. "Teak (Tectona grandis Linn.): a renowned timber plant with potential medicinal values." International Journal of Pharmacy and Pharmaceutical Sciences 6.1 (2014): 48-54.
3. Kaushik, Atul, Meena Kumari, and Anghesom Ghebremedhin. "Studies on antitussive effect of Tectona grandis roots using a cough model induced by sulfur dioxide gas in guinea pigs." International Journal of Phytomedicine 3.2 (2011): 279.
4. Ramachandran, Subramaniam, Aiyalu Rajasekaran, and KT Manisenthil Kumar. "Antidiabetic, antihyperlipidemic and antioxidant potential of methanol extract of Tectona grandis flowers in streptozotocin induced diabetic rats." Asian Pacific Journal of Tropical Medicine 4.8 (2011): 624-631.
5. Vyas, Pooja, Dinesh Kumar Yadav, and Poonam Khandelwal. "Tectona grandis (teak)–A review on its phytochemical and therapeutic potential." Natural product research 33.16 (2019): 2338-2354.
6. Sharma, Vipin, and K. C. Samanta. "Hypoglycemic activity of methanolic extract of Tectona grandis linn. Root in alloxan induced diabetic rats." Journal of Applied Pharmaceutical Science Issue (2011): 106-109.
7. Khera, N. E. H. A., and S. A. N. G. E. E. T. A. Bhargava. "Phytochemical and pharmacological evaluation of Tectona grandis Linn." Int J Pharm Pharm Sci 5.3 (2013): 923-927.
8. Shaheedha, S. M., and S. Hemalatha. "Anti-ulcer activity of methanol extract of Tectona grandis Linn." International Research Journal of Pharmaceutical and Applied Sciences 10.1 (2020): 7-10.
9. Goswami, D., et al. "An overview of Tectona grandis: chemistry and pharmacological profile." Pharmacognosy Reviews 3.5 (2009): 181.
10. Garg, Vikas. "FREE RADICAL SCAVENGING ACTIVITY OF TECTONA GRANDIS ROOTS."
11. Asdaq, Syed Mohammed Basheeruddin, et al. "Tectona grandis Lf: A comprehensive review on its patents, chemical constituents, and biological activities." Saudi Journal of Biological Sciences (2021).
12. Asdaq, Syed Mohammed Basheeruddin, et al. "Tectona grandis Lf: A comprehensive review on its patents, chemical constituents, and biological activities." Saudi Journal of Biological Sciences (2021).
13. Shalini, Srivastava R., and Rachana Srivastav. "Antifungal activity screening and HPLC analysis of crude extract from Tectona grandis, Shilajit, Valeriana wallachi." The International Journal of Alternative Medicine 5.2 (2008): 1540-2584.
14. Rani, G. Jhansi, and N. Lakshmi Bhavani. "Phytochemical investigation and Antipyretic activity of Tectona grandis Linn." Research Journal of Pharmacy and Technology 14.8 (2021): 4221-4225.
15. Sharma, Priyanka, K. C. Samanta, and K. S. Rathore. "Antipyretic activity of methanolic extract of root of Tectona grandis Linn. on albino rats." Int J Pharmacol Toxicol 1.2 (2011): 28-33.
16. rights are reserved by Pravin, All, and K. Singh. "Antiulcer Activity Using Ethanolic Extract of Tectona grandis Linn. Root."
17. Gururaja, M. P. "A Review on Ethnopharmacology of Tectona grandis."
18. Husen, Azamal. "Stock-plant etiolation causes drifts in total soluble sugars and anthraquinones, and promotes adventitious root formation in teak (Tectona grandis L. f.) coppice shoots." Plant Growth Regulation 54 (2008): 13-21.
19. Gabin Thierry M. Bitchagno, Leonard Sama Fonkeng, Théodora K. Kopa, Michel F. Tala, Hippolyte Kamdem Wabo, Christopher B. Tume, Pierre Tane and Jules-Roger Kuiate. Antibacterial activity of ethanolic extractand compounds from fruits of Tectona grandis (Verbenaceae). Bitchagno et al. BMC Complementary and Alternative Medicine, 2015; 15: 265.
20. Shruthi d.p, sunith k.e, haritha kumari e, govindappa m,siddalingeshwara k.g. phytochemical screening, antioxidant and anti-inflammatory Activity of different extracts from leaf, stem and bark of Tectona grandis. Ijrpp., 2012; 1(2): [140-146].
21. Sushilkumar B. Varma and Sapna P. Giri. Study of wound healing activity of Tectona grandis Linn. leaf extract on rats. Anc Sci Life, 2013; 32(4): 241–244
22. Mallika, Sk, et al. "Evaluation of hypo lipidemic and antioxident properties of methanolic extract of leaves of Tectona grandis linn on Mithionine induced model in Wister albino rats." Indian Journal of Research in Pharmacy and Biotechnology 5.2 (2017): 84-87.
23. Abubakar, S., et al. "Perfection of organic dye from Tectona grandis (Linn) young leaves methanolic extract for mycological staining." International Journal of Biological Sciences and Technology 6.6 (2014): 31.
24. Chaithra, S. R., and Bijesh Vatakkeel. "A REVIEW ON PHARMACOLOGICAL USES OF TECTONA GRANDIS. LINN." (2020).
25. Devi, DP Aruna, and Arya Prabhu. "A Critical Literary Review of Shaka/Teak (Tectona Grandis Linn) and the Pharmacognosy of Shaka Pushpa."
26. Kushwah, A. S., P. Kaur, and T. B. Shivanandappa. "Effect of methanolic extracts of Tectona grandis linn leaves on diabetic neuropathy in streptozotocin–induced diabetic rats." MOJ Drug Des Develop Ther 2.4 (2018): 203-209.
27. Ghareeb, Mosad A., et al. "Radical scavenging potential and cytotoxic activity of phenolic compounds from Tectona grandis (Linn.)." Global Journal of Pharmacology 7.4 (2013): 486-497.

28. Sahay, Manisha, and Richa Sharma. "Antioxidant activity of tectona grandis linn stem bark extract." International Journal of Innovative Science, Engineering & Technology 2.11 (2015): 906-908.
29. Masilamani, Poomaruthai, et al. "Effect of ageing on in vitro true seed and in vivo drupe germination and its dormancy mechanism in teak (Tectona grandis Linn. f)." Journal of Applied and Natural Science 14.3 (2022): 720-728.
30. Javalgikar, Akshay, et al. "In vitro anti-inflammatory and anthelmintic activity of Tectona grandis leaves extract." Internationa Journal of Herbal Medicine 7.2 (2019): 26-40.
31. Sharma, Priyanka, K. C. Pooja, and Kamal Singh Rathore. "Written on January 1, 2011 at 3: 44 pm by admin." GROUP 18: 0h.