

Phytochemistry and Pharmacological Potential of Lantana Camara L.: A Comprehensive Review

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ABSTRACT:

Lantana camara L., commonly known as wild sage, is a widely distributed medicinal plant with a strong background in traditional medicine and modern pharmacology. Originating from the Americas, it is now naturalized in many tropical and subtropical regions and is considered both a therapeutic resource and an invasive weed. This review provides a comprehensive overview of the ethnomedicinal relevance, phytochemical constituents, and pharmacological activities of *Lantana camara*. Key constituents such as terpenoids, flavonoids, alkaloids, and glycosides contribute to its wide range of bioactivities including antimicrobial, anticancer, antidiabetic, anti-inflammatory, anti-aging, and wound healing effects. Despite its promising pharmacological potential, further intensive clinical and toxicological studies are required to validate and standardize its use.

Keywords: *Lantana camara*, traditional medicine, phytochemicals, pharmacological activity, antimicrobial, anti-inflammatory.

on disease. Generally, the focus is on the overall condition of the individual, rather than on the particular ailment or disease from which the patient is suffering, and the use of herbs is a core part of all systems of traditional medicine (Engelbrecht 2002; Conboy et al. 2007; Rishton 2008; Schmidt et al. 2008).



Fig: 1 Indian Traditional Medicine

I. INTRODUCTION:

Traditional medicine is “the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, used in the maintenance of health and in the prevention, diagnosis, improvement or treatment of physical and mental illness” (World Health Organization, http://www.who.int/topics/traditional_medicine/en/). There are many different systems of traditional medicine, and the philosophy and practices of each are influenced by the prevailing conditions, environment, and geographic area within which it first evolved (WHO 2005), however, a common philosophy is a holistic approach to life, equilibrium of the mind, body, and the environment, and an emphasis on health rather than

Traditional Chinese medicine (TCM) is an important example of how ancient and accumulated knowledge is applied in a holistic approach in present day health care. TCM has a history of more than 3000 years (Xutian, Zhang, and Louise 2009). The book *The Divine Farmer's Classic of Herbalism* was compiled about 2000 years ago in China and is the oldest known herbal text in the world, though the accumulated and methodically collected information on herbs has been developed into various herbal pharmacopoeias and many monographs on individual herbs exist.



Fig: 2 Types Of Traditional Medicine

II. PLANT PROFILE:

Lantana camara, commonly known as wild sage or red sage, is a flowering shrub native to the Americas, but it has become widely naturalized and is considered an invasive species in many parts of the world, including India. It's known for its vibrant, multi-colored flowers and is both a medicinal plant and a potential threat to biodiversity.

Synonym: *L. aculeata* L.; *Camara vulgaris* Benth.; *Lantana armata* Schauer; *Lantana scabrida* Sol.; *Lantana tiliifolia* Cham.

Biological Source: The biological source of *Lantana camara* is the whole plant of “*Lantanacamara* L”

Family: Verbenaceae



Fig: 3 *Lantana camara*

2.1 TAXONOMICAL CLASSIFICATION:

- ✦ **Kingdom:** Plantae (Plants) - This places it within the broader category of eukaryotic organisms that are photosynthetic.
- ✦ **Division:** Magnoliophyta (Flowering Plants) - This indicates that it is a vascular plant that produces flowers and fruits.
- ✦ **Class:** Magnoliopsida (Dicotyledons) - This refers to a group of flowering plants

characterized by having two cotyledons in their seeds.

- ✦ **Order:** Lamiales - This places it within a diverse order of flowering plants that includes mints, olives, and snapdragons.
- ✦ **Family:** Verbenaceae (Verbena Family) - This family includes various herbs and shrubs, many of which are fragrant.
- ✦ **Genus:** *Lantana* - This group consists of around 150 species of flowering plants within the Verbenaceae family.
- ✦ **Species:** *Lantana camara* - This is the specific name for the common lantana, known for its fragrant, colorful flower clusters and often invasive nature.

2.2 VERNACULAR NAMES:

- ✦ **Tamil:** Unnichedi
- ✦ **Telugu:** Gajupulu
- ✦ **Malayalam:** Arippoochedi, Arippu, Eedamakki, Kaniya, Kattuchinda, Konda.
- ✦ **Hindi:** Raimuniya
- ✦ **Marathi:** Ghaneri, Tantani
- ✦ **English:** *Lantana*, Shrub verbena, Wild sage
- ✦ **Sanskrit:** Chaturangi, Vanacchedi
- ✦ **Manipuri:** Samballei, Nongballei, Thirei
- ✦ **Kannada:** Kadugulabi, Chitrangi, Hunnigida
- ✦ **Oria:** Nagaboyari, Naguari

2.3 DESCRIPTION:

L. camara has small tubular-shaped flowers, which each have four petals and are arranged in clusters in terminal areas stems.



Fig: 4 Non – Native *Lantana camara*

2.4 MORPHOLOGY:

Habit: *Lantana camara* is a thorny shrub, often upright but can be half-climbing or hanging, reaching heights of 2-3 meters.

Stems: The stems are angular and bear curved spines, particularly along the edges.

Leaves: The leaves are simple, opposite, and decussate (arranged in pairs that alternate at right angles). They are oval, with a rough lamina, and have a regularly toothed margin with an acute apex.

Inflorescence: The flowers are arranged in dense, rounded, umbel-like heads, often described as hemispherical or flat-topped. They are typically brightly colored (yellow, pink, or orange) and sweetly scented.

Flowers: Individual flowers are small, tubular, and have five lobes. They are often arranged in a way that creates a bicolored effect, with different colors in the center and outer rings.

Fruits: The fruits are small, fleshy drupes, about 3 mm in diameter, that change color from green to blue or black as they mature.

Thorns: The plant has thorns or prickles along its stems and branches.

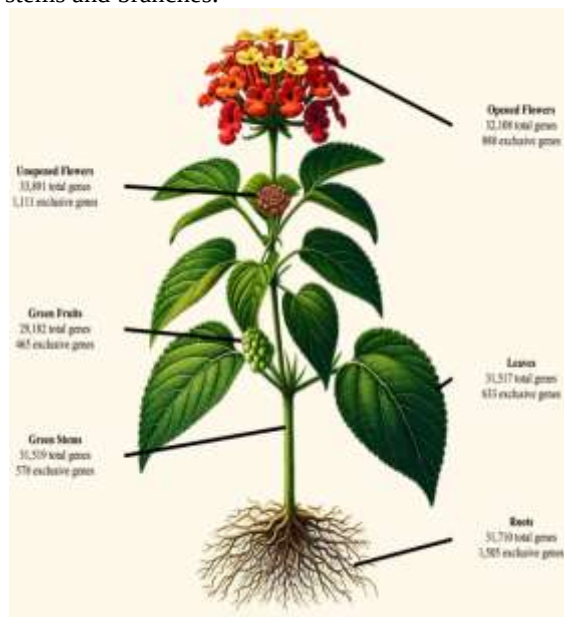


Fig: 5 Morphology *Lantana camara*

2.5 CHEMICAL CONSTITUENTS:

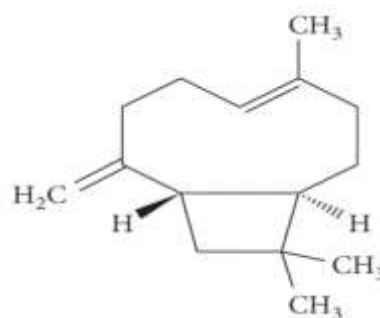
✚ **Terpenoids:** A large group including monoterpenes and sesquiterpenes, with examples like caryophyllene, humulene, germacrene D, and bicyclogermacrene.

✚ **Flavonoids:** A class of plant pigments with antioxidant properties.

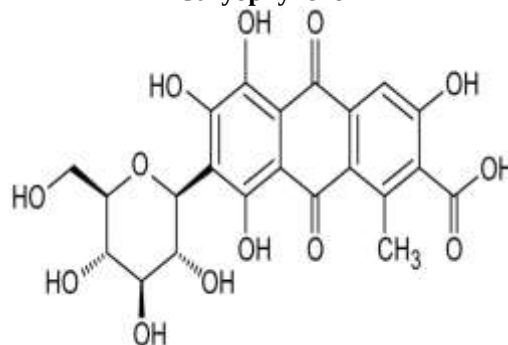
✚ **Alkaloids:** Nitrogen-containing compounds that can have various biological effects.

✚ **Glycosides:** Compounds that contain a sugar molecule attached to another organic molecule.

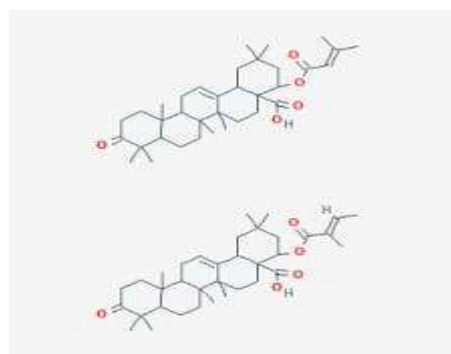
✚ **Other notable compounds:** Lantadene A, lantadene B, and icterogenin, which are pentacyclic triterpenes, as well as camarinic acid, lancamarolide, and others.



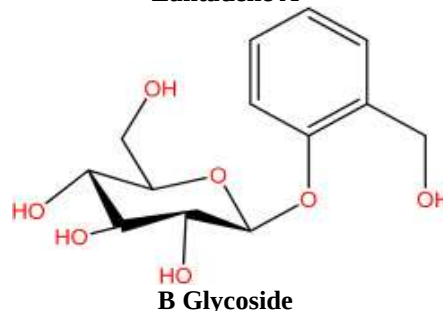
Caryophyllene



Camarinic Acid



Lantadene A



B Glycoside

Fig: 6 Chemical Constituents

2.6 MEDICINAL USES:

- ✚ **Anti-cancer activity:** Research suggests that Lantana camara extracts may possess anti-cancer properties.
- ✚ **Wound healing:** Studies indicate that it can promote wound healing and has antioxidant properties.
- ✚ **Antimicrobial activity:** Some studies have explored its antibacterial and antifungal potential.
- ✚ **Potential anti-diabetic effects:** Research suggests potential benefits in managing diabetes.
- ✚ **Anti-aging potential:** Studies in fruit flies have shown that Lantana camara extracts may have anti-aging effects.
- ✚ **Analgesic and anti-inflammatory properties:** It has demonstrated potential as a pain reliever and anti-inflammatory agent.

III. LITERATURE REVIEW:

S.N O	PLANT NAME	SOLVENT	ACTIVITY	RESULT (CONCLUSION)	REFERENCES
1.	Lantana camara	Methanol	Anti Microbial	Traditionally, it has been used in treating various ailments and they are supported by scientific data. However, most of the pharmacological studies were preliminary and requires intensive preclinical and clinical studies to evaluate the efficacy and toxicity of these plant products	GIRISH K (2016)
2.	Lantana camara	Ethyl Acetate	Anti - Cancer	Studies revealed the anti-proliferative activities of all the novel analogues against A375 & A431 cancer cell lines, along with putative binding affinity towards 1LE9 & 3QA8.	Monika Chauha n(2023)
3.	Lantana camara	Methanol	Anti- Mutagenic	In general, the leaves and flowers of L. camara demonstrated anti-mutagenic activities with higher activities in the leaves compared to flowers.	Zahra Zare I (2020)
4.	Lantana camara	Dichloro Methane And Methanol	Anti-Bacterial	The antimicrobial properties of the Lantana camara leaf hydrosol which is waste of Essential oil show higher activities towards gram - positive bacteria comparative gram-negative bacteria.	Manish Dubey (2011)
5.	Lantana camara	Distilled Water	Nematicidal	. The control of M .incognita by the leaf extracts used in this study might be probably based on a complex mode of action involving multiple mechanisms	Faheem Ahmed (2010)

6.	Lantana camara	Methyl Chloride	Anti Thrombin	In comparison with Heparin L. camara extract shown 50.10, 60.23, 62.32, 68.48 and 71.32% antithrombin activity at 10, 20, 40, 60, 80 and 100 mg/mL concentration, respectively. It means that for achieving the 98.13% antithrombin activity, the concentration of L. camara has to increase	SmitaMujbaile (2023)
7.	Lantana camara	Methanol	Anti-Leukemia	The extracts were assessed for their anti-proliferative potential on two AML cell lines, and the root extract, in particular, showed significant cytotoxicity	Braz.J.Biol (2024)
8.	Lantana camara Martynos ide	Ethanol	Anticonvulsant	flowers extracts of L. camara have excellent anti-convulsant property which are possibly mediated partly via facilitation of GABA transmission and the results verify its traditional use in epilepsy.	Javed Khan Pathan1, (2019)
9.	Lantana camara	Methanol	Anti Atherothrombosis	. We supposed MELC-mediated anti atherombosis activity may plug in its cytoprotectivity via radical scavenging, protein and HRBCs protestant capabilities	SayefShahriad Ripon (2017)
10.	Lantana camara	Hydro Alcohol	Sunscreen Agent	. Nature could redress suffering and ailments of mankind. Natural therapy is always convivial and biocompatible compared to synthetic counterparts.	Abhinay Kumar Dwivedi (2025)
11.	Lantana camara	Ethanol.	Anti Diabetic	The extract demonstrated moderate inhibitory activity with IC50 values of $318.95 \pm 2.73 \mu\text{g/mL}$ for α -amylase and $313.97 \pm 2.45 \mu\text{g/mL}$ for β -glucosidase, which were statistically significant though less potent than the standard drug acarbose ($p < 0.001$).	Sathya Karunakaran (2021)

12	Lantana camara	Acetone	Mosquito Larvicidal	The weed L. camaraaculeata extracts showed promising activity in mosquito control and its commercial utilization is very much feasible.	Periaswamy Hemalatha (2015)
13	Lantana camara	Methanol	Anti Mycotic	It also suggests that a great attention to medicinal plants which are found plenty of pharmacological properties.	RenuJangid ,Tahira begum (2020)
14.	Lantana camara	Petroleum Ether, Ethyl Acetate, Ethanol, And Water	Anti Arthritic	The present study can serve as great useful information in validating the traditional claim for Rheumatism of L. camara	Rupali Dhikale (2025)
15.	Lantana camara	Hydro Alcohol	Anti-Angiogenic Activity	The investigation reveals the phytochemicals of the extract are responsible for antiangiogenic activity.	G. Ramdhan, (2022)
16.	Lantana camara	Methanol	Anti Inflammatory	The structures were characterized by routine NMR and MS techniques and electronic circular dichroism (ECD) calculations. The anti-inflammatory screening revealed that compounds 2, 3, and 5 were more active for the inhibition of NO production	Peng Wu (2020)

17.	Lantana camara	Hydro-Alcohol	Anti Hypoglycemic Agent	Discovery of new drugs to fight incurable diseases such as diabetes mellitus is an on-going area of research by scientist worldwide. Many plant-derived triterpenes have been reported to exert beneficial effects in metabolic disorders	Ibitade.O.Jawonisi (2015)
18.	Lantana camara	Distilled Water	Anti Diareheal	The obtained results of the present study confirm antidiarrheal activity of the stem of L. camara, thus provide the scientific basis for the traditional uses of this plant as a treatment for diarrhoea	EdlamTadesse (2017)
19.	Lantana camara	hexane, ethyl acetate, acetone and methanol	ACHE inhibitor	Coumaran acts on the respiratory pigments of the insect and can be used as a biofumigant. The probable reason could be AChE inhibition at the cholinergic synapses of the insects	<u>Yallappa Rajashekar</u> (2014)
20.	Lantana camara	methanol, ethanol, ethyl acetate, acetone, and distill water	Insecticidal	. According to the results of the present investigation, both leaf powder and extract oil possessed insecticidal properties, feeding, and ovipositional deterrent effect against the most economically important maize storage pests	Adane Adunga Ayalew (2020)

Table: 1 Review Of Lantana Camara

IV. DISCUSSION:

Traditional medicine systems around the world have long used plants as foundational health remedies. The World Health Organization (WHO) defines traditional medicine as the sum of knowledge, skills, and practices based on cultural beliefs and experiences that are used to maintain health and treat illnesses. A central tenet in such systems is a holistic approach to health and healing. Among the many plants utilized, Lantana camara L. has emerged as a significant species of interest

due to its versatile applications in ethnomedicine. Lantana camara belongs to the family Verbenaceae and is known by various vernacular names across India. Its extensive use in traditional remedies is supported by modern research. Phytochemically, it is rich in biologically active constituents like caryophyllene, lantadene A and B, camarinic acid, flavonoids, and alkaloids.

Several pharmacological studies have highlighted the potential of L. camara extracts against a variety of health conditions. It

demonstrates strong antibacterial, antifungal, anticancer, antidiabetic, and anti-inflammatory properties. For example, studies using methanol and ethyl acetate extracts have shown significant antimicrobial and anticancer properties. Other investigations report activities such as anti-thrombin, antiarthritic, antileukemic, antiangiogenic, and larvicidal actions. Nonetheless, despite the growing body of experimental evidence, most studies remain at the in vitro or animal model stage. Clinical trials and toxicity profiling are essential for integrating *L. camara*-based compounds into formal medical applications.

V. CONCLUSION:

Lantana camara is a promising plant species with diverse therapeutic applications validated by preliminary pharmacological studies. It contains a broad range of bioactive compounds with activities supporting its use in traditional medicine. However, to advance *L. camara* from folk remedy to a standardized therapeutic agent, more extensive preclinical and clinical research is essential. The plant's dual identity as both a medicinal herb and an ecological threat warrants a balanced, regulated approach to its utilization.

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