



“LANTANA CAMARA: A VALUABLE MEDICINAL PLANT”

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ABSTRACT

India has a rich tradition of a plant-based knowledge in health care. Among the large number of herbal drugs existing in India, very few have studied systematically so far. **Lantana camara** is an evergreen plant found everywhere in India it is well known to cure several diseases and used in various folk medicinal preparations. Lantana camara belonging to family of **verbanaceae**. In last few decades, scientists, researchers around the globe have elaborately studied in the chemical composition of whole plant of L. Camara as well as biological pharmacological activities. Different parts of the plants are used in the treatment of cold, headache, chickenpox, eye injuries, cuts, cancer, leprosy, skin itches, asthma and arterial hypertension . Studies conducted in India have found that lantana leaves can display antimicrobial, Fungicidal and insecticidal properties. Traditionally it has been used treating various ailments and they were supported by scientific data's. Systemic analysis of this plant provides a variety of bioactive molecules for development of newer pharmaceutical product. The knowledge of medicine and medicinal plants and their study of scientific chemical principles may lead to the discovery of newer and cheaper drugs. In the present era, researchers are focusing on medicinal plant research throughout the world as medicinal plants are an important and cheap source of drugs and have long history. Most of the remedies in the traditional system were taken from plants due to lack of technology as using plants as remedies were proven to be useful. This article reviews the Pharmacological activities and toxicology of lantana camara. Systemic Analysis of these plants provides a variety of bioactive molecules for development of newer pharmaceutical product.

Key Words: Medicinal plants, Lantana camara linn., Phytoconstituents, Biodiversity and pharmacology

INTRODUCTION

Lantana camara Linn. Is flowering ornamental plant belonging to family **Verbenaceae**. In India L. Camara was probably introduced before 19th century. Currently L. Camara is distributed throughout India where there is a moderate to high summer rainfall and Well-drained sloping Sites. The plants can grow individually in clumps or as dense thickets, crowding out more desirable species.

In last few decades, many of traditionally known plants have been extensively studied by advanced scientific techniques and reported for various medicinal properties viz including anticancer, antiinflammatory, anti-diabetic, antibacterial, and antifungal effects. all of its qualities, such as antitumor, anti-inflammatory, anti-diabetic, antibacterial, and antifungal effects.

There are about 650 different types of the major weed *Lantana camara* in more than 60 different nations. *Lantana*, which derives from the Latin *lento*, which means to bend, possibly got its name from the genus *Viburnum*, to which it bears some resemblance in terms of leaf and flowering. In 1809, the species was brought from Sri Lanka to India. In 1807, *lantana* was presented to India as an attractive shrub at the National Botanical Gardens in Calcutta.

A significant amount of research has been done on the chemical components of *lantana camara*, particularly in India. The roots are used to treat toothaches, the flowers to treat chest complaints in children, and the leaf oil is used as an antiseptic for wounds. Leaf extracts also have antiproliferative, antibacterial, fungicidal, insecticidal, and nematocidal properties.

According to pharmacological studies, *Lantana camara* shoot extracts had potent antioxidant properties. The present project work aims to Document the medicinal properties of *L. camara* and its Future prospects for the further scientific investigation for the development of effective therapeutic Compounds.

LANTANA CAMARA



Fig.1 Lantana Plant

About Lantana

Botanical Name: *Lantana Camara* Linn.

Common Names:

English: Lantana Weed

Hindi: Raimuniya

Marathi: Ghaneri, Tantani

Family: Verbenaceae

Plant Form: Shrub

Ayurveda Description:

Sanskrit Name: Chaturangi, Vanacchedi

Properties: Rasa: Kashaya, Tikta; Guna; Guru; Virya: Sita

Therapeutic Uses: Plant pacifies vitiated condition of vata And kapha

MORPHOLOGY

Lantana camara is a vigorous, low-erect or subscandent shrub that grows between 1.2 and 2.4 metres (or even more). It has sturdy, recurved prickles with a pungent aroma of black currants. Its root system is very strong. Shrub with several branches that grows in clumps, thickets, or vines.



Fig. Flower & Fruit of *Lantana Camara*

Stem - Square stems have minute, recurved prickles. The branches and stems have angular shapes and are organised along the margins with curving spines.

Leaves - Along the stem, opposing leaves grow that are bright green, about 6 cm long, and with round toothed edges.

Flowers - They are around 2.5 cm in diameter and come in a variety of colours, including pale cream, yellow, white, pink, orange, red, lilac, and purple. Butterflies and insects fertilise the flowers.

Fruits - Fruits range in colour from blue to black and are glossy, rounded, fleshy, purplish-black when ripe, measuring about 3 mm in diameter.

History

Native to Mexico is the *lantana camara*. It arrived in India for the first time from Sri Lanka in 1809. Australia has had *lantana* as a weed for more than 160 years. *Lantanas* were introduced to Australia in 1841 as a decorative garden plant. Within 20 years, they spread, eluded domestication, and established themselves in the wild. Its original range has expanded to around 50 different nations, where it has established itself as an invasive species. It originally left the Americas when Dutch explorers carried it to Europe and widely farmed it there. It then quickly spread throughout Asia and Oceania where it quickly became known as a noxious plant, and the Portuguese introduced it to Goa.

Distribution:

A worldwide plant is *lantana camara*. More than 60 nations have received it, including those in Africa, America, Australia, China, Hong Kong, Malaysia, India, Sri Lanka, the United States, and New Zealand.

Habitat:

It frequently happens in agricultural areas, coastal regions, natural woods, planted forests, grasslands, riparian zones, shrub lands, urban areas, wet lands, and other wastelands.

Life Cycle:

All year long, germination and flowering take place, but they peak following summer rains. Per square metre, thousands of seeds that are viable for several years can be produced. According to research, some types of ornamental lantana have the capacity to produce seeds and propagate vegetatively. Additionally, they have the capacity to cross-pollinate with wild forms, giving rise to new varieties that may eventually become a part of the environment. They also produce some viable pollen.

Types of Lantana Species:

Because of their eye-catching blooms and capacity to draw native pollinators, Lantana species are common garden plants. Before beginning a lantana garden, though, make careful to consult your state's or region's list of invasive plants because some species have the potential to spread quickly. In general, hot, humid temperatures are necessary for all lantana species to truly flourish. The southern United States is home to several of these species. Lantana species are extremely low maintenance and a lovely addition to your garden if the climate is right for them.

1.Common Lantana (*Lantana camara*):

One of the lantana flower species that is most frequently grown is the common lantana, also known as shrub verben. You can grow this species as an annual or in a container in cooler locations. Even though this is a wonderful plant to liven up your garden or house, if you reside in a tropical climate, take extra precautions. The common lantana is invasive in Texas, Florida, Hawaii, and some regions of Australia because it spreads so quickly.

Local range:South and Central America.

2. Trailing Lantana (*Lantana montevidens*):



Trailing lantana has a wide spread, dense leaves, and lovely flowers, making it an excellent choice for dense ground cover. It is a robust grower as well, and while being less invasive than its cousin, *L. camara*, it has escaped gardens across the southern United States. The plant should be avoided because of its small hairs, which can irritate skin.

Local range:

South America's tropics (The species name derives from its discovery in Montevideo, Uruguay)

3. Buttonsage (*Lantana involucrata*):



A lantana species that is native to the U.S., buttonsage is a sweet little shrub. When the leaves are crushed, they have a fragrance similar to sage, giving this lantana plant its common name.

Native Range:

South Florida to Central and South America.

4. Popcorn Lantana (*Lantana trifolia*):



Also called lavender popcorn, this lantana plant is as much cultivated for its decorative fruit as for its flowers. Giving the plant its common name, the fruits form in bundles that look like individual pieces of purple popcorn! Don't be tempted to eat them, however, many lantana species are poisonous.

Local Range: West Indies, Mexico, Central, and South America.

ETHNOPHARMACOLOGY

- *Lantana camara* L. is a medicinal plant that has been used to treat a variety of illnesses all over the world.
- Its leaves can be boiled to make a tea, and its decoction is used to treat tetanus, malaria, cough, and wounds.
- In Ghana, the whole plant's infusion is used to treat bronchitis, and the roots powder mixed with milk is used to treat stomach pain.
- An earlier study demonstrates that lancamarone, a significant steroid derived from *L. camara* leaves, has cardiotoxic potentials.
- Its leaves have historically been employed as both an insecticide and a tonic for stomachaches.
- In several Asian nations, the plant's leaves have used for Cuts, rheumatism, ulcers, Catarrhal infection, tetanus, malaria, cancer, Chicken pox, asthma, ulcer, swelling, eczema, tumour, high Blood pressure, bilious fever, ataxy of abdominal viscera, Sores, measles, fevers, cold, and high blood pressure are all treated with leaves.
- In Ghana, the entire plant is infused to treat bronchitis. Children were given the powdered root in milk for stomach aches and as a vermifuge.
- *Lantana* oil is used as an antiseptic for wounds and to treat skin irritations like leprosy and scabies decoctions were applied externally.

ISOLATION OF BIOACTIVE COMPOUNDS FROM LANTANA CAMARA

The first requirement for creating tissue cultures is the choice of healthy plant material. Thus, leaves from *Lantana* plants with pink-yellow flowers were selected for this investigation. Following each phase of disinfecting the leaves with 1% (v/v) Tween-20 and 0.1% (w/v) mercuric chloride, the leaves were given three rinses in sterile distilled water. A 5 mm cork borer was used to prepare the leaf disc explants. All of the callus induction and proliferation assays employed MS (Murashige and Skoog, 1962) medium as their base medium, which was solidified with 0.8% agar and supplemented with 30 g/L sucrose

(HiMedia Laboratories, Mumbai, India). Before autoclaving the media at 1.06 kg cm² and 121°C for 15 minutes, the pH of the media was corrected to 5.8.

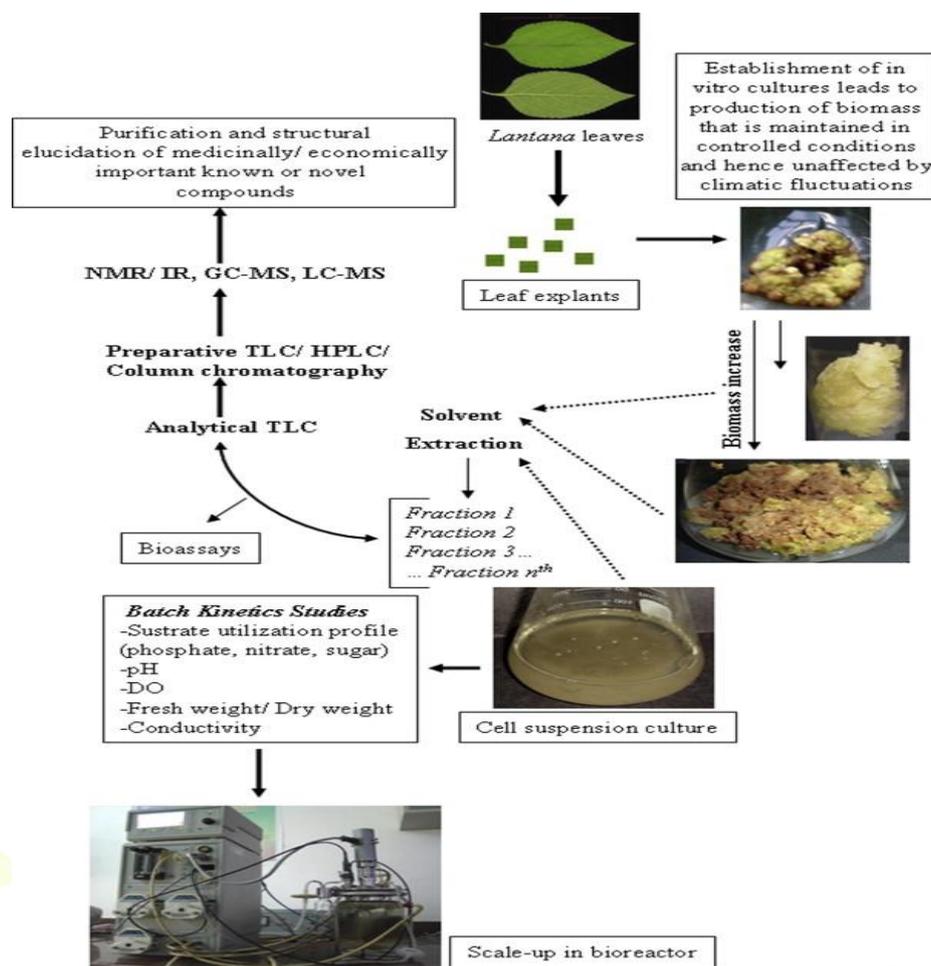


Fig. Process of Isolation of Bioactive Compounds From Lantana Camara

MEDICINAL PROPERTIES OF LANTANA CAMARA

- ❖ A range of illnesses have been treated with the *Lantana camara* plant. It was discovered to be used in traditional cures for tumours and cancer. The leaves were used as a poultice to cure wounds, chicken pox, and measles in Central and South America.
- ❖ Camara formulations are also used to treat high blood pressure, asthma, rheumatism, and colds.
- ❖ A tea made from *Lantana camara* flowers and leaves was used to treat fever, the flu, and stomach-aches.
- ❖ The whole plant was infused in Ghana to treat bronchitis, and milk mixed with the powdered root was given to kids with stomach aches.
- ❖ From the leaves, an alkaloid fraction was isolated that caused dogs to shiver, accelerate deep breathing, and lower blood pressure.
- ❖ It was mentioned that it might be helpful for treating asthma and hypertension as well as lowering fevers. The authenticity of the assertions that lantamine, an alkaloid from the stem, bark and roots, displayed antipyretic and antispasmodic qualities and lancamarone, a steroid from the leaves, had cardiac tonic properties has not been established.
- ❖ Olenolic acid is abundant in the roots of *Lantana camara*. From *Lantana* leaves, a translactone-containing triterpene with hepatoprotective properties also exhibited thrombin inhibitory action.
- ❖ Lantadene - A, B, C, and olenolic acid are found in a pentacyclic triterpenoid that has received attention in drug research for its anti-cancer, antibacterial, AIDS, and anti-inflammatory activities (major).

- ❖ An antioxidant Umuhengerin, an antimicrobial found in *L. trifolia* leaves, and ursolic acid, an anti-inflammatory triterpenoid found in stems, leaves, and roots.

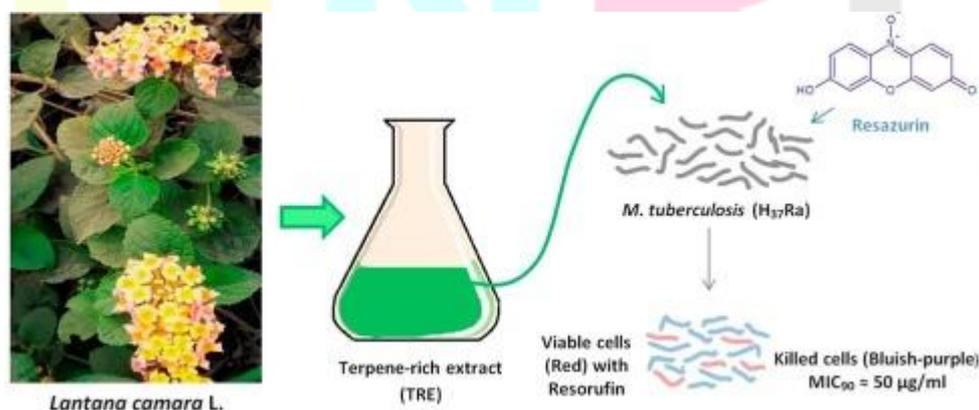
Antibacterial activity:



Fig. Antioxidant, antibacterial and cytotoxic potential of silver nanoparticles synthesized using terpenes rich extract of *Lantana camara* L. leaves

The agar well diffusion method was used to prepare and assess the antibacterial properties of *Lantana camara* leaf and yellow, lavender, red, and white flower ethyl acetate, acetone, and chloroform extract. Only ethyl acetate extracts, with the exception of *Salmonella aureus*, proved to be the most effective against all bacteria. The bacteria were not significantly inhibited by extracts of acetone or chloroform. The zone of inhibition values for all four types of *L. camara* flower extracts ranged from 10 to 21 mm, exhibiting nearly identical antibacterial activities. With a zone of inhibition of 21 and 20 mm, respectively, *L. camara* yellow and white flower extracts had the strongest inhibitory activity against *Bacillus subtilis*. With a zone of inhibition area that ranged from 9 to 15 mm, leaf extracts showed less inhibitory effects than flower extracts did against all of the microorganisms tested. *Escherichia coli* was discovered to be the bacteria that responded best to extracts of *camara* flowers and leaves. All *L. camara* flower and leaf extracts were discovered to be extremely sensitive to *P. aeruginosa* and *Bacillus subtilis*. *L. camara* demonstrated appreciable results against mycobacterial tuberculosis and produced minimum inhibitory concentrations (MICs) and minimum bactericidal concentrations (MBCs) of 37.5 mg/ml against both *Salmonella aureus* and *pseudomonas aeruginosa*. Because ethanolic extract exhibits activity against *bacillus substilis* and *pseudomonas*, *L. camara* is used to treat microbial disease.

Antimycobacterial activity:



Evaluation of terpene-rich extract of *Lantana camara* L. leaves for antimicrobial activity against mycobacteria using Resazurin Microtiter Assay (REMA)

Lantana camara L. (Verbenaceae) is notorious weed, leaves of which are rich in terpenes, in the form of essential oil. Terpenes have potent antimicrobial and antimycobacterial activities. Depending upon saponification characteristic of lipids and waxes; unsaponified petroleum ether

extract which contain only terpenes, can be prepared. Terpene-rich extract (TRE) of *L. camara* leaves has exhibited higher antioxidant and antimicrobial activities as compared to any solvent extract.

Internationally accepted mycobacterium tuberculosis (MTB) strain standards include H37Rv and TMC-331, which are rifampicin-sensitive and rifampicin-resistant, respectively. Rifampicin levels were 1.0 g/ml for both the H37Rv and wild strains, however TMC-331 barely responded to the drug.

The H37Rv strain of *M. tuberculosis* required a minimum bactericidal concentration (MBC) of 30 g/ml for the methanol extract of *L. camara* and 20 g/ml for the TMC-331 and wild strains, whereas the MBC for rifampicin was 2.0 g/ml for both strains. By being significantly more effective than rifampicin against the rifampicin-resistant strain of *Mycobacterium tuberculosis*, *L. camara* extracts demonstrated a competitive advantage (MTB).

Wound healing activity:

The leaf extract of *Lantana camara* has been shown to have antiseptic, anti-leprosy activity. The ethanol extract of *L. camara* increased the rate of wound contraction by 87 % in burn wound when compared to controls (82%). The slight reduction in the wound area might be due to the antimicrobial effect of the leaf extract against *Staphylococcus aureus*, *Klebsiella* and *Escherichia coli*. By comparing between 1st and 19th day significant wound healing activity showed in Sprague dawley rats [2]. The hydroalcoholic extract and fresh juice of *L. camara* leaves have flavoured wound contraction (Kurian 1995).

Insecticidal activity:

Natural insecticide *L. camara* leaves methanol extract was investigated for highest repellent activity against *Anopheles stephensi* with an average 2.63 mosquito landings whereas hexane extract shows 3.17 mosquito landings were found in Ibadan, Nigeria [25]. Synthetic mosquito repellents show side effects.

According to Dua et al. (1996) [26], *Lantana camara* and coconut oil extract were effective against *Aedes aegypti* (94% protection for 2 hours) and *Aedes albopictus* (50% protection for 4 hours). After a 24-hour treatment period, *L. camara* hexane extract exhibits insecticidal effectiveness against maize weevil (73.3%) and bean weevil (93%) [27]. *L. camara* has insecticidal properties against grain storage.

Topical activity against dermatophilosis:

For the past three years, there has been no sign of a return of the condition after using an ointment made with an ethanolic extract of *Lantana camara* leaves, *Senna alata*, and *Mitracarpus scaber* to treat acute or chronic dermatophilosis lesions. Hair has also grown on the treated areas. Using the stabilisation of red blood cell membrane lysing technique, the extracts of *Lantana camara* and its fractions were examined for their anti-inflammatory properties. The entire plant extract exhibits a favourable response for tannins, flavonoids, and saponins while ethyl acetate and butanol fractions exhibit favourable responses for flavonoids and saponins, respectively. The erythrocyte membrane is protected by the percentage membrane stability compared to Ibuprofen, Indomethacin, and Ethanol, with ethyl acetate showing the highest protection against induced lyses.

Antifungal Activity:

Antifungal activities of *Lantana camara* have been reported. Experiments on mode of action suggested that the extracts lyse the cells and alter the cell membranes integrity by depleting the ergosterol content, which avoids the reoccurrence. Different solvent extracts, EO's as well as nanoparticles of *Lantana camara* have great antifungal activity. Crude extract of *L. camara* root was effective against *Cladosporium sphaerospermum*. *L. camara* extract significantly inhibited the radial growth of *Fusarium oxysporum* f. sp. *Lini* causing wilt of linseed at 30% conc. and checked the wilt of linseed in wilt still pots. Seed treatment with leaf powder drastically reduced the plant mortality even after 40 days of sowing.

Patel et.al screened the antimicrobial activity of lantana camara extract and reported antifungal activity against *Aspergillus niger* and *Aspergillus awamori*.

HERBAL MEDICINES

- ❖ The presence of hazardous substances in several *Lantana* species. making it a crucial species to investigate the phytochemistry of. P. G. J. Louw conducted the first comprehensive investigation on the chemical components of *L. camara* in 1943.
- ❖ In 1948, when Lantadene B, with the chemical formula $C_{33}H_{48}O_5$, was separated from all portions of the *Lantana* shrub, he reported the isolation of its principal active component, Lantanin, with the molecular formula $C_{32}H_{44}O_5$, which he later dubbed Lantadene A. (Louw, 1948).
- ❖ Nearly all of *Lantana*'s biological properties, including its antipyretic, antimicrobial, antimutagenic, antimicrobial, fungicidal, insecticidal, and nematocidal properties, are thought to be attributed to Lantadenes.
- ❖ Some of these biological activities may be partially attributed to *Lantana*'s secondary metabolites, which include alkaloids, terpenoids, phenolics, iridoid glycosides, furanonaphthoquinones, flavonoids, phenyl ethanoid glycosides, and other compounds.
- ❖ Studies on the essential oils were the focus of the earliest work on *Lantana* species; the maximum yield obtained by hydro distillation from the leaves reached 0.2% and from the flowers, up to 0.6%.
- ❖ The dry weight of *lantana* contains 16.2% lignin, 26% cellulose, 21% hemicellulose, and 31% hot water-soluble fiber.
- ❖ Research on the antibacterial capabilities of *L. camara* has been done extensively all over the world. In Indian medicine, it is used as an intestinal antiseptic, diaphoretic, sudorific, and to cure tetanus, rheumatism, and malaria. Extracts from the leaves also have antibacterial, fungicidal, insecticidal, and nematocidal properties. It helps with tumours, pustules, and fistulae. In cases of tetanus, rheumatism, malaria, and atoxia of the abdominal viscera, a decoction of the plant is prescribed.
- ❖ Cuts, ulcers, and swollen areas can be treated with pounded leaves. A lotion for wounds is made from a decoction of plants and fruits.
- ❖ Externally, it is used as a lotion or fomentation to treat eczema outbreaks and rheumatism. Internally, it is taken as an infusion for bilious fever and catarrhal ailments. The use of stems.
- ❖ In the past, *lantana* leaves that had been crushed were applied topically to cure snakebites.

INDUSTRIAL USE OF LANTANA

- Originally introduced to most countries as a garden ornamental.
- Research community is exploring various uses of the plant, In addition to perfume ingredient.
- Essential oil from the leaves possesses adulticidal activity against the different mosquito species. Thus, this species can be utilized for oil-based insecticides as supplementary to synthetic insecticides.
- The leaf oil is used in the treatment of itches of skin and also useful as an antiseptic for wounds.
- The bark of the stem and roots contain a quinine-like alkaloid, lantanine, with strong antipyretic and antispasmodic properties.
- Acid extracts of the shoots show antibacterial activity against *Escherichia coli*.

- Lantana biomass could be utilized as fertilizer, energy, fuel wood, pulp, paper fiber and developing roofing material (NAS, 1981). Its straw is used for biogas product, dung manufacture.
- It could be a good raw material for paper and pulp industry. The stalks have been tried as raw materials for paper pulp and contain furfuroids (21.6%), lignin (14.0%), cellulose (30.6%) and ash (3.50%).
- Lantana biomass is used directly for various purposes and most important is as supplementary fuelwood for cooking and heating by people.
- Making furniture from Lantana is a direct utilization of biomass from the wild.
- This strategy could be useful in control of Lantana weed and simultaneously better utilization of alien species. It regenerates very fast even after lopping and attains high biomass yields.
- Lantana stems though are thin the wood is very tough and durable and thus useful for various handicrafts such as wickerwork.
- The Soliga of Karnataka is now-a-days utilizing Lantana in their wickercraft as bamboo resources are scarce and costly and the bamboo forests have been invaded by Lantana.
- Paper Industry: The stems of Lantana, if treated by the sulphate process, can be used to produce pulp for paper suitable for writing and printing.
- Rubber Industry: The roots of Lantana contain a substance that may possibly be used for rubber manufacture.

LANTANA OIL:



It is used to treat a number of widespread skin conditions, most notably measles, chicken pox, scabies, and skin fungus. It has amazing respiratory properties that can quiet down and deepen breathing in addition to having a remarkably relaxing, balancing, and cooling effect. It has excellent anti-bacterial and antibacterial qualities, is a fantastic wound healer, and can help stop bleeding. used in energy healing and massage.

The oil is obtained from Uttarakhand hill farmers and is approved by the state of Uttarakhand's Center for Aromatic Plants.

Using Lantana Essential Oil at Home:

1. To refresh a space, blend lantana plant essential oil extract with water. The resulting mist has a floral-woody scent.

2. You can use the blend as a diffuser. For a heavenly aroma of woodiness, mix a few drops of the essential oil with your liquid detergent and use it to wash your sweaters or flannel shirts.
3. Use it to freshen the air as you clean the house. It's easy to do; just put a few drops of the essential oil in every new bag you place in the vacuum. You can put a few drops in the washable filter of your vacuum if it has one. The aroma of your home will be wonderful as you vacuum!
4. You can add it with disinfectants or water used for mopping to make your home smell fresh and natural.
5. Add a few drops on your furnace air filters. Let the scent diffuse throughout your homes.

LANTANA LEAVES USED AS NATURAL HOME REMEDY

- **Cough** – Lantana leaves have a natural cooling effect, which When inhaled, can help alleviate a cough.
- **Flu (Influenza)** – The natural cooling sensation of lantana Leaves can help to bring down a fever when infected with flu.
- **Headache** – Lantana leaf tea is a traditional home remedy for Helping all eviate headaches.
- **Indigestion** – Lantana leaf tea can help soothe various Indigestion symptoms.
- **Joint Pain** – Lantana leaf medicinal uses include being a Natural remedy for helping to treat rheumatic pain in the joint.

CONCLUSION

Natural medicine is now much more in demand than it was previously. Therefore, it should go without saying that research on medicinal plants is essential for the creation of herbal medications that benefit people. One of the most important medicinal plants used in traditional medicine around the world is lantana camara. It follows that Lantana camara is well-known for being utilized in folk medicine all across the world. Scientific and ethnomedical studies on L. camara's therapeutic properties have revealed that it is a valuable plant and a possible drug development target. Additionally, it has been asserted that it can be applied externally to treat scabies and leprosy as well as act as an antiseptic on cuts and soothe itchy skin.

REFERENCES

- 1) Ganesh T, Saikatsen, Thilagam G, Loganatham T, Raja Chakraborty; Pharmacognostic and anti hyperglycemic Evaluation of lantana camara (L) var. aculeate Leaves in alloxaninduced hyperglycemic rats, Int J Res Pharm., 2010; 1(3): 247-252.
- 2) Barre JT, Bowden BF, Coll JC, De Jesus J, De La Fuente VE, Janairo GC, Ragasa CY; A bioactive triterpene from Lantana camara. Phytochemistry, 1997; 45 (2):321-324.
- 3) Bashir, S.; Jabeen, K.; Iqbal, S.; Javed, S.; Naeem, A. Lantana camara: Phytochemical Analysis and Antifungal Prospective. Planta Daninha 2019, 37, <https://doi.org/10.1590/s0100-83582019370100137>.
- 4) Bhuvaneshwari, E.; Giri, R.S. Physicochemical and phytochemical screening in Lantanacamara leaves. Journal of Pharmacognosy and Phytochemistry 2018, 7, 1962–1966.
- 5) Verma, R.K.; Verma, S.K. Phytochemical and termiticidal study of Lantana camara var. aculeata leaves. Fitoterapia 2006, 77, 466–468, <https://doi.org/10.1016/j.fitote.2006.05.014>

- 6) Badakhshan MP, Sasidharan S, Rameshwar NJ, Ramanathan S; A comparative study: antimicrobial activity of methanol extracts of *Lantana camara* various parts. *Pharmacognosy Research*, 2009; 1 (6):348-351.
- 7) Acharya, C.L. & P.D. Sharma.1994. Tillage and mulch effects on soil physical environment, root growth, nutrient uptake and yield of maize and wheat on an Alfisol in north-west India. *Soil and Tillage Research* 32: 291-302.
- 8) CSIR. 1962. *The Wealth of India (Raw Material)* Vol. 6. Pp. 31-35. Council of Scientific and Industrial Research, New Delhi.
- 9) Sabu MC and Kuttan R. Anti-diabetic activity of medicinal plants and its relationship with their antioxidant property. *Journal of Ethnopharmacology*. 81 (2); 2002:155-160.
- 10) Day, M., C.J. Wiley, J. Playford & M.P. Zalucki. 2003. *Lantana: current management status and future prospects*. ACIAR Monograph 102: 28
- 11) Nayak BS, Raju SS, Ramsubhag A. Investigation of wound healing activity of *Lantana camara* in Sprague Dawley Rats using a burn wound model. *Int J Appl Res Nat Pro* 2008;1(1):15-19.
- 12) Jitendra P, GS Kumar, Shahimqureshi MD, Bharatkumar D, Ashokumar K. Phytochemicals and pharmacological activities of *Lantana camara* Linn. *Research Journal of Pharmacognosy and Pharmacodynamics* 2010;2(6):418-422.
- 13) Deepak G, Silviya S, Kishwar HK. Biochemical composition and antibacterial activities of *Lantana camara* plant with yellow, lavender, red, white flowers. *EurAsia J BioSciences* 2009;3:69-77.
- 14) Claude K, Paul Waako, Moses Joloba, Otwaoydek. The antimycobacterial activity of *Lantana camara* plant traditionally used in south-western Uganda. *Afr Health Sci* 2010; 4(1):40-45.
- 15) Mary Kensa V. Studies on phytochemical screening and anti-bacterial activities of *Lantana camara* Linn. *Plant Sciences feed* 2011;1(5):74-79.
- 16) plantsnap.com was first indexed by Google 2013 <https://www.plantsnap.com/plantblog/types-of-lantana/> in May
- 17) zizira.com was first indexed by Google more than 10 years ago <https://www.zizira.com/blogs/plants/lantana-camara>
- 18) Sagar L, Sehgal R, Ojha S; Evaluation of Antimotility effect of *Lantana camara* L. var. *Aculeata* constituents on neostigmine induced Gastrointestinal transit in mice. *BMC Complementary and Alternative Medicine*, 2005; 5: 18.
- 19) Ito K, Ito M (2011) Sedative effects of vapor inhalation of the essential oil of *Microtoenapatchoulii* and its related compounds. *J Nat Med* 65:336–343. <https://doi.org/10.1007/s11418-010-0502-x>
- 20) https://en.m.wikipedia.org/wiki/Lantana_camara#cite_ref-Day_7-2
- 21) A review of *Lantana camara* studies in India N. Priyanka, P. Joshi Published 2013 *Environmental Science*
- 22) Jitendra P, GS Kumar, Deviprasad SP, Shamimqureshi MD. Phytochemical and anthelmintic evaluation of *Lantana camara* (L) var. *aculeata* leaves against *Pheretima posthuma*. *Journal of Global Trends in Pharmaceutical Sciences* 2011;2(1):11-20.
- 23) Shahid P, Rajinder R, PK Verma, Pankaj NK. Medicinal plants and their role in wound healing. *Vetscan* 2008;3(1).
- 24) Deepak G, Silviya S, Kishwar HK. Biochemical composition and antibacterial activities of *Lantana camara* plant with yellow, lavender, red, white flowers. *EurAsia J BioSciences* 2009;3:69-77.
- 25) Rajesh D, Amita G, Mandal TG, Deshdeepak S, Vivek B, Gaurav AM, Lavekar GS. Antimicrobial activity of some Indian medicinal plants. *Afr. J. Trad. Cam* 2007;4(3):313-318
- 26) Mayee R, Thosar A. Evaluation of *Lantana camara* Linn. (verbanaceae) for Antiuro lithiatic and Antioxidant activities in rats. *Int. J Pharm clin. Res.* 2011;3(1):10-14.
- Ogendo JO, Walker DJ, Belmain SR, Deng AL. Comparison of toxic and repellent effects of

- Lantana camara with tephysosia vogelii hook and a synthetic pesticide against sito philus zeamais motschulsky in stored maize grain. *Insect Sci. Applic.* 2003;23(2):127-135.
- 27) Emmanuel NA, Akakpo JA, Moudachirou M, Leclercq JQ. Treatment of bovine dermatophilosis with senna alata, Lantana camara and mitracarpus scaber leaf extracts. *Journal of Ethanopharmacology* 2003;86:167-171.
- 28) Ooyedapo O, Akinpelu BA, Akinwanmi KF, Adeyinka MO, Sipeolu FO. Red blood cell membrane stabilizing potentials of extracts of Lantana camara and its fractions. *Adv. In Nat. Appl. Sci.* 2010;2(4):46-51.
- 29) Herbal Medicine and Biotechnology for the Benefit of Human Health Priyanka Srivastava, Rakhi Chaturvedi, in *Animal Biotechnology*, 2014
- 30) Alves TM, Silva AF, Brandão M, Grandi TS, Smânia E, Smânia Júnior A, et al. Biological screening of Brazilian medicinal plants. *Mem Inst Oswaldo Cruz* 2000;95:367-73.
- 31) Tripathi AK, Shukla BN. Antifungal activity of some plant extracts Against Fusarium oxysporum sp. Causing wilt of linseed. *J Mycol Plant Pathol* 2002;32:266-7.
- 32) Patel SJ, Venugopalan N, Pradeep S. Screening for antimicrobial Activity of weeds. *Internet J Microbiol* 2007;4(1).

