A Review on Phytochemistry and Medicinal Properties of *Lantana Camara* Linn.

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Abstract:

Traditional medicine, knowledge of medicinal plants, and the study of scientific chemical principles can contribute to the discovery of new and cheapest medicines. Lantana camara plant treatment of many illnesses and is used for different medicines for people. The chemical composition of the entire Lantana camara plant has been researched in an extensive way by scientists and researchers across the globe in the last few decades. Lantana Camara as well as the pharmacological biological operations. Such studies identified Lantana camara therapeutic potential in modern medicines, as well as a potential candidate for drug discovery. This study gives a glimpse of ethnobotany, phytochemistry, pharmacology.

Keywords: Herbs, Lantana camara Linn., Phytochemistry, Pharmacology.

Introduction:

Herbage are an excellent resource base for the traditional medicine and herbal industries and they provide a large number of livelihoods and health care to Indian residents [1]. Modern medicinal products, mainly herbal in nature, are now used to treat the disease. Different herbal formulations exist now a day [2]. The WHO acknowledged this fact in the early 1970's and urged governments to use herbal medicines to prevent diseases and promote health. Herbal medicines became popular in the healthcare sector. In recent years, the consumption of those formulations and botanicals has increased. The different parts of the plants contain various constituents that have different pharmacological effects. Medicinal plants are an important source of compounds which are medically important. Medicinal plants have been used since the ancient times to treat different forms of health problems [3].

A variety of bioactive molecules are available for the manufacture of new medicinal drugs by systematic study of these plants. The pharmacological examination of various plants used in different modern medicinal systems recently became more and more involved. In recent decades, many plants have been detailed studied using advanced scientific mechanisms and a wider range of medical properties, including anti-cancer, anti-inflammatory activity, anti-diabetic activity, anthelmintic activity and larvicidal activity, etc. [4].

One of the plants is Lantana camara Linn. The word Lantana camara is derived from the sense of the Latin word lento, isto bend. Ghaneri (Marathi) commonly known as Lantana camara. It is an ornamental flowering plant belonging to the Verbenaceae family. Lantana camara is used for treating wounds, swellings, ulcers, cataracts, bilious fever, itching, eczema, and rheumatism in traditional medicine systems [5]. Different parts of the Lantana camara plant are used to treat flu, fever, whooping cough, asthma, chicken pox, bronchitis, eye injuries and high blood pressure. Lantana camara has conducted scientific studies for various treatments such as antibacterial, antioxidant, antipyretic, insecticide, antimicrobial, wound healing. Nowadays this Lantana camara is used in many advanced techniques like heavy metal phytoextraction, particulate emission phyto remediation and much more [6].
In *Lantana camara* phytoconstituents are present in all parts which has been published in various literatures. Over the last few decades, scientists and researchers around the globe have researched in an elaborate manner the chemical composition of the entire *Lantana* plant [7]. The main purpose of this is to provide a complete report of the literature on its phytoconstituents present in every section of the *Lantana camara*. The plant is widely spread through Indian states of Uttarakhand, Uttar Pradesh, Himachal Pradesh, and the North-East [8]. The present analysis aims to report a complete literature on its phytochemistry and pharmacological operations. *Lantana camara* is frequently used as a traditional medicine, and in some areas as firewood and grassland [9].

![Figure No.1 The plant of *Lantana camara* Linn.](image)

**Taxonomy:**

Geographical Distribution:

*Lantana camara* is a tropical native plant and originated in Central and Northern South America and the Caribbean. Today, the *Lantana camara* is distributed in nearly 60 countries, including New Zealand, Mexico, Florida, Trinidad, Jamaica, and Brazil. It is found in many countries in Africa including Kenya, Uganda, Tanzania, and South Africa [11].

Before 19th century, *Lantana camara* was possibly introduced in India. *Lantana camara* is currently distributed in all of India. In India viz. Ghaneri (Marathi), Raimuniya (Hindi), Sage (English), Bunga pagar (Malaysia), Kembang telek (Indonesia), Yeesun (Thailand) *Lantana camara* is known by different names in various languages [12].

Plant Morphology:

The *Lantana camara* is usually referred to as wild or red sage. It is a fragrant evergreen shrub, it grows up to 1-2 min height. It grows up to 2000 m luxury in tropical, subtropical and temperate regions. The species selected for *Lantana camara* is a low stiff or sub concentrated shrub with a tetrangular base, rough warm pickled and blackcurrant odour. The plant grows up to 1 to 3 meters in width and can reach up to 2.5 meters. Leaves oblong ovovate, acute or sub-acute, serrate, rugoseon, scab on both sides. Leaves and stems are coated with fur which is rough. Small flora (known as umbels) held in clusters. The colour is usually black and most of the time there are different shades of white. Tored and the colour of the flowers usually changes with age. Literally year-round flowers have a yellow throat in the eye of the axis. The calyx is asmall, slender corollatube, 6 to 7 mm wide and divided into unequal lobes. Stamens with four ovaries into two pairs. The flowers of the pair form in the opposite leaf pot. The flowers are small, dome-shaped, 2-3 cm long and have 20-40 Cecil flowers. The root system is very good and provides the eye for new fresh shoots [13].

Ethnopharmacology:

*Lantana camara* is an essential medicinal plant in traditional medicine systems, with many uses. It is being used to treat health problems in different parts of the world. Leaf wounds, rheumatism, ulcers, catarrhal infections, tetanus, rheumatoid arthritis, malaria, cancer, chicken pox, asthma, ulceration, inflammation, eczema, tumor, gallbladder fever, abdominal visceral taxi, throat, measles, fever, cold and high blood pressure. In Ghana, the whole plant is poured to treat bronchitis, and milk powder was given to the root as a vermilion. *Lantana camara* oil is used to treat skin itching as an antiseptic for wolves. Decoctions were used in prosa and external gulls [14].
Parts Uses of LantanaCamara Linn.:  

Seeds, stem, root, leaves and flowers are also used beside the entire plant.

<table>
<thead>
<tr>
<th>PARTS OF LANTANA CAMARA LINN.</th>
<th>USES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds</td>
<td>Berry fruits are useful in fistulas, ulcers, tumors and arthritis.</td>
</tr>
<tr>
<td>Stem</td>
<td>It is used as an astringent in cutinigus eruptions, leprosy ulcers, and used as a lotion.</td>
</tr>
<tr>
<td>Roots</td>
<td>These are used to treat a toothache.</td>
</tr>
<tr>
<td>Leaves</td>
<td>The leaf oil is used as an antiseptic for scars; Leaves Boiled and used for swelling and pain in the body.</td>
</tr>
<tr>
<td>Flowers</td>
<td>It is used to treat children with chest problems. Weed flower serves as a hedge weed, providing perch sites for butterflies and moths and covers nectar sources.</td>
</tr>
<tr>
<td>Stalk</td>
<td>It is used as a raw material for paper pulp which is also used in the manufacture of baskets and temporary shelters and as biofuel for the wrapping, writing, and printing of paper.</td>
</tr>
</tbody>
</table>

Table no. 1- Parts uses of Lantana camara Linn  

Phytochemistry:  

Phytochemical constituents of the Lantana camara has been investigated extensively over the past only a few decades. The different parts of the Lantana camara are essential oils, phenolic compounds, flavonoids, carbohydrates, proteins, alkaloids, glycosides, phenyl ethanoic, oligosaccharides, quinine, saponins etc. [15].

The leaves contain a volatile oil, 0.22%, called lantanol, 80% caryophyllene and like bicyclic terpene and 10-12% l-d-phellandrene.

Dried flowers contain volatile oil 0.07%, In Bark Lantanine 0.08%.

U.S.A Lantana brassilinaceae, an associated species containing alkaloids, lantin-like quinine with antispasmodic effect, was reported in the hospital. Toxicity issue to the presence of toxic triterpenoids-lantadene (lantadene A, B, C, D). The leaves contain steroid, lancamarone, which is a fish poison and is considered cardiovascular. Roots are rich in oleanolic acid, a hepatoprotective triterpenoid [16].

A study of the leaves for the chemical compound obtained from essential oils identified 30 compounds, mostly mono and sesquiterpenes were identified. Its essential oil contains
phellandrene and lantanolic acid. In a test done on sheep, the plant was discovered to contain lantadene B, which is toxic in dosages of 200-300 mg/kg. Research has shown that the alkaloid it contains helps to lower hypertension, stimulate deep respiration, but causes shivering in dogs. It also stimulates bowel movements and retards uterine movement in mice. Its alkaloids have low levels of toxin and therefore might just be a potential cure for asthma, fever, and arterial hypertension. Compounds isolated from this plant are lancamarone and lactic acid [17].
Pharmacological Activity:

Antibacterial activity:

The *Lantana camara* ethanolic extracts exhibit antibacterial action. *L. Montevidensis* leaves and roots of normal and multi-resistant bacteria isolated from clinical material are presented against gram-positive and gram-negative strains. The microdilution procedure was used to assess minimum inhibitory concentration (MIC). The excerpts showed antibacterial activity against all bacteria examined, but the *L. Montevidensis* fresh leaf extract has the best effect against *P. aeruginosa* (MIC 8 mg/mL) and multi-resistant *E. Coli*. These results are guiding new work for both species to isolate the constituents responsible for the behavior [18].

*Lantanacamera* has antibacterial properties. *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Streptococcus* spp. Bacteria in the unwashed fruit sample isolated from the epicarp. The minimum inhibitory concentration on the leaves *Pseudomonas aeruginosa* is 12 mg/mL for the methanol extract, and 48 mg/mL for the ethanol extract. Inhibits *Streptococcus* spp. with minimum concentration up to *Streptococcus* spp. The minimum inhibitory concentration was 8 mg/mL for methanol extract and 4 mg/mL for ethanol extract, while 25 mg/mL for the ethanol extract for *Staphylococcus aureus*. Methanol extracts havethe highest activity on 8 mg/mL *Staphylococcus aureus*, followed by 12 mg/mL *Pseudomonas aeruginosa* and the least was on *Streptococcus* spp. of 25 mg/mL. Though the highest activity was on *Streptococcus* spp. with ethanolic extracts. *Staphylococcus aureus* at 4 mg/mL followed at 7 mg/mL and *Pseudomonas aeruginosa* at 48 mg/mL was the least. Therefore, *Lantanacamera* leaves contain bioactive compounds and are believed to destroy microorganisms at various concentrations [19].

The antibacterial activity of lantic acid was performed using bioautography assays for Gram-positive and Gram-negative bacteria. Lantic acid was found
to have strong antibacterial activity against *Escherichia coli* and *Bacillus cereus*, in which the minimum inhibition doses were 0.08 and 0.1 ug, respectively, compared to 0.05 and 0.005 fg ug or chloramphenicol. The findings indicate that lactic acid has a wide spectrum of antibacterial activity and may hold potential as an antimicrobial non-selective agent [20].

**Anticancer activity:**

The anticancer activity of each extract of *Lantana camara* was investigated against lung carcinoma cell line by MTT test. The hexane extract that showed anticancer activity was purified by silicagel column eluted with ethylacetate and methanol. The ethyl acetate fraction that showed the anticancer activity against lung cancer cell was analysed by GC/MS. So, the present study is an addition for the anticancer activities of essential oils. Through this study we strongly recommend evaluation of such essential oils in *in-vivo* experiments against different types of cancer cells, as an initial step for clinical trials and chemotherapy of cancer disease [21].

This leaves extracts are found to have anticancer activities, Triterpenes is the active principle which is responsible for these beneficial effects. Leaves on liver cancer HepG2 cell lines. We found Methanol extracts of *Lantana camara* leaves have phytochemical compounds that are inhibitorier, scavenging free radicals with less anticancer activities [22].

**Anti-inflammatory activity:**

Anti-inflammatory activity was reported using aquatic animal models from the *Lantana camara* plant. An anti-inflammatory activity test is performed using carrageenan-induced lung edema and pleurisy mice. The doses showed significant (*p < 0.05*) anti-inflammatory. Therefore, the extract may possess substances with anti-inflammatory. The result of this study supports traditional use of this plant for pain and inflammatory diseases [23].

*Lantana camara* aqueous extract has been documented for its anti-inflammatory action in albino rats. Treatment with extract (500mg / kg body weight) rat carrageenan-mediated paw oedema tests significantly reduced paw volume [24].

**Antioxidant activity:**

Methanolic extracts of *Lantana camara* were reported antioxidant activity. This extract was demonstrated for potential radical scavenging activity (DPPH), xanthine oxidase inhibition activity, and potential antioxidant activity by the Griess-Ilosvay method. *Lantana camara* extracts exhibit great potential for antioxidant [25].
Ethanol extract of *Lantana camara* in vitro studies camara exhibited significant antioxidant activity. Therapy with the extract reduced the level of lipid peroxidation in urolithic rat kidneys. The DPPH radical scavenging assay and the Nitric Oxide free radical scavenging assay were performed *in-vitro*. In both assays the extract exhibited strong antioxidant properties [26].

The *Lantana camara* leaves antioxidant activity. The camara registered a reduction in power activity and a radical scavenging assay of 1, 1-diphenyl-2-picrylhydrazyl (DPPH). Younger leaves had stronger antioxidant action than older or mature leaves but had higher antioxidant effect on leaf extracts [27].

**Wound healing activity:**

The water distillate of *Lantana camara* flowers were reported ‘wound healing’ activity on albinorat excision and incision wound models of Wistar strain. The animals were divided into four groups, each with 6 animals. No treatment was found on group I (control). Group II animals were treated with 5% w/w povidone iodine (positive control). Group III and IV group 5% and 10% ointment, *Lantana camara* essential oil treatment. Wound healing parameters such as wound contraction rate and epithelial duration were observed for the emission model, while tensile strength was observed in the incision model. The results were analyzed using a one-way ANOVA through a multiple comparison test of Tukey’s [28].

Wound healing action of *Lantana camara* leaves extract in rats. In both modelsthe animals were divided into two groups of 12 each. *Lantana camara* ontreatment group animals (100 mg/kg/day) was treated with water-like extract. Wounds were treated with the extract enhanced significantly. Wound contraction rate (98%), collagen synthesis, and wound healing time decreased [29].

**Larvicidal activity:**

Aqueous leaf extracts of *Lantana camara* was reported larvicidal activity. The larvae necessitated 80 mg/100 ml concentration of the aqueous extract for 100% mortality in six hours. This study proved that the aqueous leaf extract of *Lantana camara* and *Catharanthus roseus* can be used as an effective larvicidal drug for controlling mosquito larvae [30].

Methanol and ethanol extract of leaves and flowers of *Lantana camara* was reported mosquito larvicidal activity. Larvicidal effect on 3 and 4 instar larvae of mosquito species *Aedes aegypti* and *Culex rd.th. quinquefasciatus* have been investigated in a dose...
dependent manner for 24 hrs. with 1.0 mg/ml concentration of extracts of *Lantana camara* maximum mortality was observed in *Aedes aegypti* exposed for 24 hr. [31].

**Antihyperglycemic activity:**

Methanol extract of the leaves *Lantana camara* antihyperglycemic activity. *Lantanacamara* has been documented in diabetic rats induced with alloxane. Oral administration of extract of methanol from *Lantana camara* (400 mg / kg body weight) leaves have caused blood glucose levels in alloxane-induced diabetic rats to decrease to 121.94 mg / dl [32].

Methanolextract*lantana camara* fruit from hypoglycaemic activity has been shown streptozotocin-induced diabetic rats (Wister albinorats). Drug therapy at doses of 100 and 200 mg / kg body weight that reduction in streptozotocin-serum glucose levels in diabetic rats. Extract treatment also improved body weight, HbA1c profile, and liver cell regeneration [33].

**Haemolytic activity:**

The *Lantana camara* aqueous extracts hemolytic activity and its solvent fractions were performed at four different concentrations (125, 250, 500, 1000 µg / ml) using modified spectroscopic method. The water extract and their non-soluble fraction exhibit extremely low haemolytic behaviour towards human erythrocytes [34].

**Antifungal activity:**

Aqueous crude extract and solvent extracts such as Methanol, Ethylacetate, Chloroform were measured at concentrations of 2 mg / mL, 4 mg / mL, and 8 mg / mL. Tests revealed that, relative to regular fluconazole (15 µg / ml), all three solvent extracts displayed substantial inhibition at higher rates. It was concluded that leaves of *Lantana camara* picked crude and solvent extract. *Lantana camara* has antifungal activity against pathogenic *Colletotrichum falcatus* and can be used to control red rot disease as a natural fungustoxicant, thus reducing synthetic fungicidereilanceto some degree [35].

*Lantana Camara* had been screened for antimicrobial activity against *Alternaria* sp. Which causes various diseases of the plants, particularly in plants with vegetables. Anti-fungal operation was conducted with three different concentrations of Viz extract, 10 mg / ml, 15 mg / ml and 20 mg / ml using the food poisoning plate process. A 20 mg / ml Dose *Lantana Camara* action against *Alternaria* sp. was significant [36].
Anti-fungalethanol operation, and *Lantana camara* hotwater extract. The *Lantana* is shown against thered and whitefungus of wood destruction. Whilebothextractsshoweddefective antifungal action against white and brownfungi, ethanol extracts werehighlypotentatextremelylowconcentrations (0.01 %) [37].

**Anti-ulcerogenic Activity:**

Antiulcerogenic activity of methanol extract from the *Lantana camara* leaves. Aspirin, ethanol, and gastric lesions caused by cold-resistant stress were documented in rats. Pre-treatment oftheremoved rats (200 and 400 mg / kgbodyweight) showed a remarkably protecive effecton aspirin-induced, ethanol-inducedand cold-tollerantinducedulcersinrats. The extract resulted in dose-based antiulcerogenic action in allmodels [38].

The *Lantana camara* methanolextract of anti-ulcerogenic activity was reported. administered orally at pyrolic-linked rates gastric ulcer induced ethanol and duodenal ulcer induced cysteamine [39].

**Conclusion:**

*Lantana camara* is a significant medicinal herb with various applications in the therapeutic folk and conventional systems. The phytochemistry and pharmacological studies showed that different aspects of the *Lantana camara* would help to raise awareness of the plant in society.

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