

# A Review on Therapeutic Activity and Medicinal Uses of *Lantana Camera Linn*

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## **ABSTRACT**

*Lantana camara* is an evergreen plant found throughout India. Traditionally it has been used in treating various ailments and they were supported by scientific data's. Various literatures have reported the phytoconstituents present in all parts of *Lantana camara*. In last few decades, scientist and researchers around the globe have elaborately studied the chemical composition of whole plant of *L. camara* as well as biological pharmacological activities. These studies established the therapeutic potential of *Lantana camara* in modern medicines and a possible candidate for the drug discovery. This article reviews the pharmacological activities and toxicology of *Lantana camara*. The study of various models related to anti-pyretic, anti-spasmodic, anti-inflammatory and various other activity of *Lantana camara*. As its well known that Indian System of Medicine generally rely on natural resources for its treatment and repair process for the betterment of human race so the exploitation in these field becomes an utmost concern to the researchers. Recently, there is a growing interest in the pharmacological evaluation of various plants used in different traditional system of medicine. *Lantana camara* is a well known medicinal plant in traditional medicinal system and recent scientific studies have emphasized the possible use of *Lantana camara* in modern medicine. The present review aims to document the morphology, distribution, phytochemistry and medicinal properties of *Lantana camara* and its future prospects for the further scientific investigation for the development of effective therapeutic compounds. The present review is an aim to give a complete report of the literature on its phytochemistry and pharmacological activity.

**KEYWORDS:** *Lantana Camara*, Pharmacology, Therapeutic uses, Traditional Use

## INTRODUCTION

*Lantana camara* Linn. is a flowering ornamental plant belonging to family Verbenaceae. *L. camara* is also known as Lantana, Wild Sage, Surinam Tea Plant, Spanish flag and West Indian lantana. 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[1-3]. Most variants have a preference for fertile organic soils, but some or all can survive on siliceous sands and sandstone-derived soils where these are of moderate depth and other conditions, especially year-round moisture, are suitable. It is a native to tropical regions and exists as dozens of strains and varieties that are highly variable in appearance. In India *Lantana camara* is introduced as an ornamental plant but entirely naturalized. However, it is specified as one of the most significant medicinal plants of the world [4-5]. The plant *Lantana camara* (Verbanaceae), generally known as wild or red sage. It is the most prevalent species of this genus and it is a woody straggling plant with different flower colors, pink, red, yellow, violet and white. *Lantana camara* has been standing as one of the most groundlaying medicinal weeds in the world.

The word *Lantana camara* obtains from Latin 'lento' which means 'to bend' [6-7]. *Lantana camara*, is a thorny (having spines) multi-stemmed, ephemeron shrub with an average height of 6ft (2m). *Lantana camara* possesses a strong root system. Stems are covered with bristly hairs when green, and are square in outline, often armed or with scattered small prickles. The roots even after repeated cuttings give new flush of shoots. Leaves are simple, opposite with long petioles, oval blades which are rough and hairy and have blunt toothed margins. The leaves of *Lantana camara* have a strong aroma. Its flowers are small, multi-coloured, dense in flat-topped clusters with a corolla having narrow tube with four short spreading lobes. The colour of flowers changes, subsequent to anthesis. *L. camara* is a well known medicinal plant in traditional medicinal system and recent scientific studies have emphasized the possible use of *L. camara* in modern medicine. The present review 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[8-9].

The flowers of *Lantana camara* occurs in cluster which includes white-pink-lavendar or yellow-orange-red mix [10-12]. *Lantana camara* is known by different name in various different languages in India viz, Raimuniya (Hindi), Chaturangi and Vanacehdi (Sanskrit), Arippu and Unnichedi (Tamil), Aripoo, Poochedi, Konginipoo and Nattachedi (Malayalam), Thirei, Samballei and Nongballei (Manipuri), Tantani and Ghaneri (Marathi), Pulikampa (Telegu), Kakke and Natahu (Kanada) [13]. Instead of being a noxious weed *Lantana camara* has several uses, mainly in herbal medicine. The plant *Lantana camara* Act as hedge plant, provide perch sites and cover [6]. The flowers act as Nectar source for butterflies and moths [14]. Stalks of *Lantana camara* used as Raw material for paper pulp which is used for wrapping, writing and printing paper [15-16].

**Taxonomical Classification:**

The botanical name of Raimuniya is *Lantana camara*. It belongs to plant family Verbanaceae. The taxonomical classification is mentioned below.

Kingdom : Plantae  
 Subkingdom : Tracheobionta  
 Superdivision : Spermatophyta  
 Division : Magnoliopsida  
 Subclass : Asteridae  
 Order : Lamiales  
 Family : Verbenaceae  
 Genus : Lantana  
 Species : *Lantana camara*

**Ayurvedic Description:**

**Sanskrit Name:** Chaturangi, Vanacchedi

**Properties: Rasa:** Kashaya, Tikta; Guna; Guru; Virya: Sita Therapeutic Uses: Plant pacifies vitiated condition of vata and kapha.



**Figure.1: *Lantana Camara* Plant with flowers**

**Growth and Distribution:**

*Lantana camara* is the most outspread species growing abundantly at altitudes up to 2000 m in tropical, subtropical and temperate regions. The species name (camara) is probably followed from the West Indian. In its native range in tropical America, *Lantana camara* mainly endows in small clumps less than or equal to 1m in diameter. In its naturalized range, *Lantana camara* usually forms dense monospecific thickets 1-4m high and approximately 1-4m in diameter. *Lantana camara* has becoming naturalized in almost 60 countries[17-19]. The distribution of *Lantana* is still expanding with many countries and Islands that are Yap, Galapagos Islands, Palau, Saipan, Tinian, Solomon Islands and Futuna Islands. At disordered areas such as roadsides, railway tracks, and canals are also favourable for the species. It does not arise to have an upper temperature or rainfall limit. *Lantana camara* can't come through under dense and intact canopies of taller native forest species, and *Lantana camara* is susceptible to frosts, low temperature, and saline soils[20-21].

**Phytochemistry:** Phytochemical composition of the *Lantana camara* has been extensively studied in last few decades. Different parts of *Lantana camara* are reported to possess essential oils, phenolic compounds, flavonoids, carbohydrates, proteins, alkaloids, glycosides, iridoid glycosides, phenyl ethanoid, oligosaccharides, quinine, saponins, steroids, triterpens, sesquiterpenoides and tannin as major phytochemical groups. Chemical constituents present in the different parts of *Lantana camara* are mentioned below[22-25].

#### **Chemical Constituents**

- $\beta$ -sitosterol, Betulonic acid, Betulinic acid, Campesterol, Hispidulin, Pectolinarigenin, Pectolinarin
- $\beta$ -pinene, 1,8-Cineole, Cinnamic acid, Dipentene, Ferulic acid, Myristic acid, Palmitic acid
- Camaraside, Camarinic acid, Camaric acid, Lantanilic acid, Linaroside, Lantanoside, Linaroside, Oleanolic acid, Ursonic acid
- 8-epiloganin, Geniposide, Icterogenic acid, Isonuomioside A, Isoverbascoside, Lamiridoside, Lantadene A, B,C, Lantanolic acid, Lantic acid, Theveside, Ursolic acid, Verbascoside
- $\rho$ -Coumaric acid, phydroxybenzoic acid, Vanillic acid[26-28].

#### **MEDICINAL AND THERAPEUTIC USES**

*Lantana camara* is an important medicinal plant and in recent history this plant is reported for various medicinal properties

#### **Antioxidant Activity**

Antioxidant activity of the leaves of *L. camara* was reported by reducing power activity and 1, 1- diphenyl-2- picrylhydrazyl (DPPH) radical scavenging assay. Leaves extracts exhibited high antioxidant effect, however younger leaves exhibited strong antioxidant activity than the older or matured leaves. Ethanolic extract of *L. camara* exhibited significant antioxidant activity in in vivo studies. The extract treatment decreased the extent of lipid peroxidation in the kidneys of urolithic rats. In vitro studies were carried out by DPPH radical scavenging assay and Nitric oxide free radical scavenging assay. Extract exhibited high antioxidant properties in both the assays[29-32].

#### **Anti-Fertility Activity**

The Effects of hydroalcoholic extract of *Lantana camara* leaves on fertility, general reproductive performance and teratology in female albino Wistar rats. The extract interfered in the frequency of fetal skeleton anomalies from dams treated with the extract and induced embryo toxicity as indicated by postimplantation loss, without any signs of maternal toxicity[33-35].

#### **Effect on red blood cells**

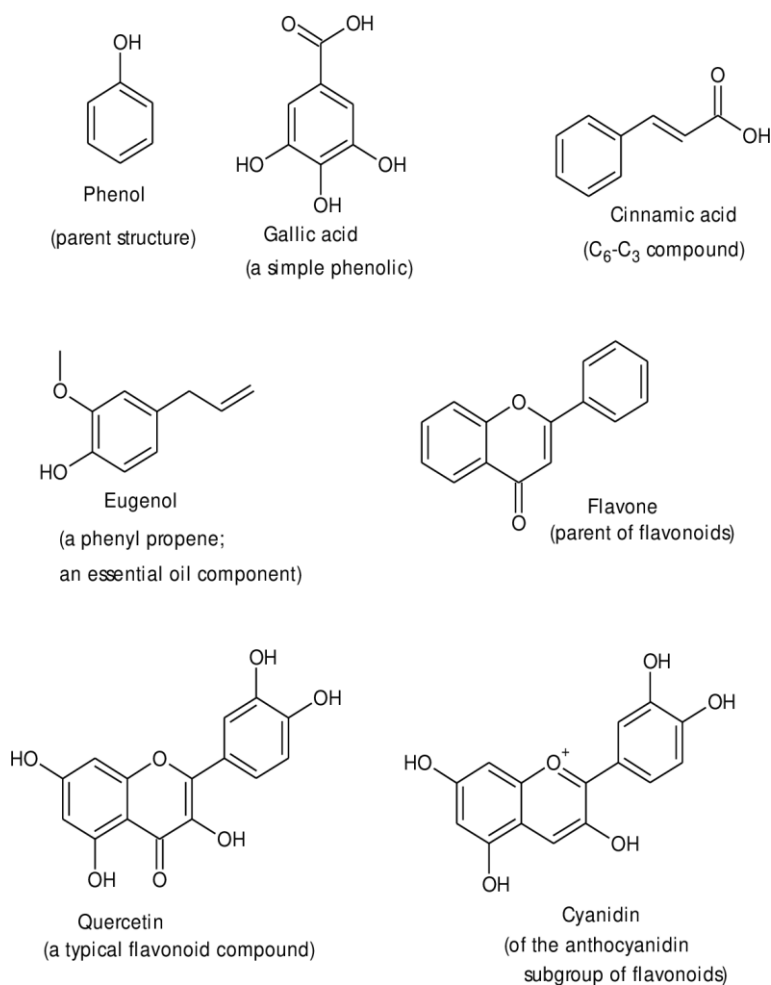
The effects of an aqueous extract of *Lantana camara* on the osmotic fragility and on the morphology of RBC were carried out. In the presence of the extract, the data obtained indicated a significant ( $p < 0.05$ ) increase of hemolysis and modifications on the morphology of RBC. These effects of the *Lantana camara* may be associated with some pharmacological properties of the chemical compounds of aqueous extract[36-38].

### Wound Healing Activity

Wound healing property of ethanol extract of leaf of *Lantana camara* adult male Wister rats. Topical application of the extract over the wound significantly increased the wound healing activity. Histological analyses of healed wounds confirmed the role of extract in healing. Studied wound healing activity of aqueous extract of leaf of *Lantana camara* in rats. Topical application of the extract on the wound (100 mg/kg/day) significantly enhanced the rate of wound contraction (98%), synthesis of collagen and decreased wound healing time[39-42].

### Anti Fungal Activity

Antifungal activity of ethanol and hot water extract of *L. camara* was screened against wood destroying white and brown rot fungi. Both extracts exhibited efficient antifungal activity against white and brown rot fungi, however ethanol extract was highly potential at very low concentration (0.01%) and also *L. camara* was screened against *Alternaria* sp. which causes different plant diseases especially in vegetable plants. The antifungal activity was performed by food poison plate method at three different concentrations of extract viz, 10 mg/ml, 15 mg/ml and 20 mg/ml. At 20mg/ml dose *L. camara* exhibited significant antifungal activity against *Alternaria* sp[43-45].



**Figure.2: Chemical Constituents of *Lantana Camara* Plants**

### **Anti-Motility Activity**

The antimotility activity of Methanol extract of *Lantana camara* leaves in mice. Intestinal motility was assayed by charcoal meal test in mice. At a dose of 1 g/kg body weight, the extract completely inhibited the transit of charcoal in normal mice. Intraperitoneal administration of 125 and 250 mg/kg body weight the extracts significantly reduced the fecal output in castor oil induced diarrhoea in mice[46-48].

### **Anti-Mutagenic Activity**

The anti- mutagenic activity of *Lantana camara*. 22 $\beta$ -acetoxylantic acid and 22 $\beta$ -dimethylacryloyloxy lantanolic acid from *Lantana camara* showed antimutagenic activity. The antimutagenicity test was performed by micronucleus test in Swiss mice. Both compounds exhibited high antimutagenic activity in Mitomycin C induced mutagenesis in mice[49-53].

### **Anti-Bacterial Activity**

The Ethanolic extracts of *Lantana camara* leaves and roots for antibacterial activity. The in vitro antibacterial activity was performed by microdilution method. The extracts exhibited antimicrobial activity against *Staphylococcus aureus*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Vibrio cholerae*, *Escherichia coli* and two multiresistant strains *E. coli* and *S. aureus*. Three different solvent extract of leaves and flowers of four different varieties of *Lantana camara* exhibited significant antibacterial activity *E. coli*, *Bacillus subtilis* and *P. aeruginosa* whereas poor antibacterial activity against *Staphylococcus aureus*[54]. The Methanolic extracts of different parts of *Lantana camara* for antimicrobial activity against 10 bacteria and 5 fungi by disk diffusion method and broth microdilution method. The leaves extract of *Lantana camara* showed highest activity against Gram positive *Bacillus cereus* and Gram negative *Salmonella typhi*[55-57].

### **Anti fertility activity (Embryo toxicity)**

Effects of hydroalcoholic extract of *L. camara* leaves was studied on fertility, general reproductive performance and teratology in female albino Wistar rats. The extract interfered in the frequency of fetal skeleton anomalies from dams treated with the extract and induced embryo toxicity as indicated by postimplantation loss, without any signs of maternal toxicity[58-60].

### **Hemolytic Activity**

The hemolytic activity of *Lantana camara* aqueous extract and its solvent fractions by modified spectroscopic method at four different concentrations (125, 250, 500, 1000  $\mu$ g/ml). The aqueous extract and its solvent fractions exhibited very low hemolytic activity towards the human erythrocytes. The hemolytic activity of the different extracts was found in the following order: chloroform fraction > hexane and ethyl acetate fraction (50:50) > aqueous extract > ethanol fraction > methanol fraction[61-63].

### **Anticancer And Antiproliferative Activity**

Different varieties of *L. camara* plant parts were reported for anticancer and antiproliferative activity. Leaves of *L. camara* were reported for antiproliferative activity against HEP-2 (laryngeal cancer) and NCIH292 (lung cancer) cell lines. In vitro antiproliferative test was performed by MTT assay. Methanol extract of *L. camara* leaves exhibited antiproliferative activity against NCI-H292 cells (% living cells= 25.8±0.19). Leaves of *L. camara* were reported to exhibit cytotoxicity effect on Vero cell line. In vitro cytotoxicity test was performed by MTT assay. The methanol extract (500 µg/ml) concentration inhibited the growth of cells 2.5 times less than did Triton 100 ×1%. Oleanonic acid isolated from *L. camara* was screened for anticancer activity against a murine tumour (Ehrlich ascites carcinoma), and three human cancer cell lines, namely A375 (malignant skin melanoma), Hep2 (epidermoid laryngeal carcinoma) and U937 (lymphoma). Oleanonic acid exhibited promising cytotoxicity against A375 cells[64-66].

### **Anti-Hyperglycemic Activity**

The Antihyperglycemic activity of methanol extract of leaves *Lantana camara* in alloxan induced diabetic rats. Oral administration of the methanol extract of *Lantana camara* (400 mg/kg body weight) leaves resulted in decrease in blood glucose level to 121.94 mg/dl in alloxan induced diabetic rats. screened Hypoglycemic activity of methanol extract of *Lantana camara* Linn fruits in streptozotocin induced diabetic rats (Wistar albino rats). Extract treatment at doses of 100 and 200 mg/kg body weight resulted in dose dependent decrease in serum glucose level in streptozotocin induced diabetic rats. Extract treatment also showed improvement in body weight, HbA1c profile as well as regeneration of liver cells[67-89].

### **Anti-Ulcer Activity**

The Antiulcerogenic activity of the methanol extract of leaves of *Lantana camara* on aspirin, ethanol and cold resistant stress induced gastric lesions in rats. Pre-treatment of the effected rats with the extract (200 and 400 mg/kg body weight) showed significant protective effect in aspirin induced, ethanol induced and cold restraint stress induced ulcers in rats. The extract resulted in dose dependent antiulcerogenic activity in all models[70].

### **Antifilarial Activity**

The Antifilarial activity of crude extract of *Lantana camara* stem. The extract and its chloroform fraction resulted in the death of adult *Brugia malayi* and sterilised most of the surviving female worms in the rodent model *Mastomyscoucha*[71].

### **Mosquito controlling activity**

Mosquito larvicidal activity of methanol and ethanol extracts of leaves and flowers of *L. camara* were reported against 3rd and 4th instar larvae of *Ae. Aegypti* and *Cx. quinquefasciatus* mosquito. Both extracts exhibited significant larvicidal activity against both species of mosquitoes; however, at low concentrations (1mg/ml) extracts were highly active against *Ae. aegypti* than that of *Cx. quinquefasciatus*. Essential oil from the leaves of *L. camara* was reported to possess adulticidal activity against *Aedes aegypti*, *Culex*

quinquefasciatus, Anopheles culicifacies, An. Fluvialitis and An. stephensi mosquitoes with LD50 values 0.06, 0.05, 0.05, 0.05 and 0.06 mg/cm(2) while LD90 values were 0.10, 0.10, 0.09, 0.09 and 0.10 mg/cm(2) against Ae. aegypti, Cx. quinquefasciatus, An. culicifacies, An. fluvialitis and An. Stephensi respectively[72-73].

## CONCLUSION

Herbal products are well thought-out to be symbols of safeguard in comparison to the synthetic product that are regarded as unsafe to human life and environment. Lantana camara is considered as weed used in folk medicine in many parts of the world. Lantana camara is an important medicinal plant with several medicinal uses in folk and traditional therapeutic system. From this review, it is quite evident that Lantana camara contains some phytoconstituents which reveal its applications for different therapeutic purposes. The Plant or its specific parts can be used for the treatment of various disorders in the human being such as antiulcer, analgesic, anti-inflammatory, antimicrobial, anthelmintic, anti-cancer antifungal, antibacterial and wound healing. Lantana oil is sometimes applied for the treatment of skin itches, as an antiseptic for wound and externally for leprosy and scabies. Yet, so much work is required with the Lanata camara to investigate the mechanism of actions with other therapeuticactivities. Most of the pharmacological studies were preliminary, carried out in animals and are not sufficient for the development of a pharmaceutical product. Still, intensive preclinical and clinical studies are required to evaluate the efficacy and toxicity of these plant products.

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