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Review article

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A review of *Lantana Camara*, A herbal medication with diverse clinical pharmacology

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ABSTRACT

The objective to the paper emphasizes on 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. The natural sources which are used widely because of their importance which is concern with lesser side effects and high tolerability. The plant used for the study is, *Lantana camara* is a perennial shrub which can grow to around 2 m tall and form dense thickets in a variety of environments. Due to extensive selective breeding throughout the 17th and 18th Centuries for use as an ornamental plant, there are now many different *Lantana camara*. *Lantana camara* Linn. is a flowering ornamental plant belonging to family Verbenaceae. *Lantana camara* is also known as Lantana, Wild Sage, Surinam Tea Plant, Spanish flag and West Indian lantana. *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.

Keyword: Lantana Camara, Pharmacology, Phytochemical, Traditional Use

INTRODUCTION

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 [1]. 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 [2]. *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' [3]. *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. The flowers of *Lantana camara* occurs in cluster which includes white-pink-lavendar or yellow-orange-red mix [4] *Lantana camara* is known by different name in various different languages in India viz, Raimuniya (Hindi), Chaturangi and Vanacehdi (Sanskrit), Arippu and Unnichedi (Tamil), Aripoov, Poochedi, Konginipoo and Nattachedi (Malayalam), Thirei, Samballei and Nongballei (Manipuri), Tantani and Ghaneri (Marathi), Pulikampa (Telugu), Kakke and Natahu (Kanada) [5]. 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 [7]. Stalks of *Lantana camara* used as Raw material for paper pulp which is used for wrapping, writing and printing paper [8]. The plant extracts has been used in folk medicine for the treatment of

cancers, chicken pox, measles, asthma, ulcers, swellings, eczema, tumors, high blood pressure, bilious fevers, catarrhal infections, tetanus, rheumatism and malaria. Further, used for the treatment of skin itches, as an antiseptic for wounds, and externally for leprosy and scabies have been documented [9]. The leaves of this plant has been used as an antitumoral, antibacterial, antihypertensive agent tonic and expectorant [10]. The fruits are useful in fistula, pustules, tumors and rheumatism [11-14], While roots used for the treatment of malaria, rheumatism, and skin rashes [15]. The constituents of essential oil of *Lantana camara* are Sabiene (19.6- 21.5%), 1, 8- Cineole (12.6- 14.8%), β -caryophyllene (12.7-13.4%), α -humulene (5.8-6.3%), two rare sesqui terpenoids humulene epoxide-III and 8-hydroxy bicyclogermacrene [16], 8-cineol (15.8%), sabinene (14.7%) and caryophyllene (8.9%) [17]. *Lantana camara* contained tannin, catachin, saponin, steroids, alkaloids, phenol, anthroquinone, protein, several tri-terpenoids, flavonoids, alkaloids, glycosides and reducing sugar which are mainly responsible for exerting diverse biological activities [18]. The present review aims to document the medicinal properties of *Lantana camara* and its future prospects for the further scientific investigation for the development of effective therapeutic compounds.

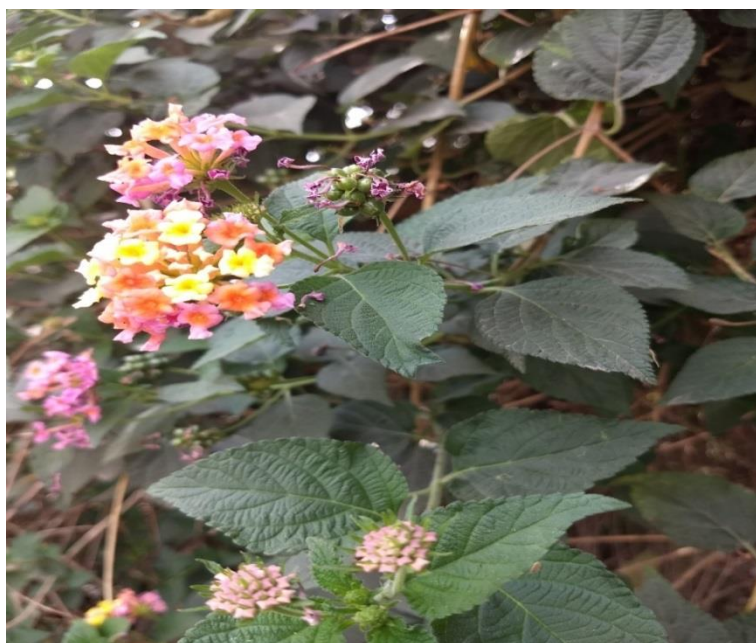


Fig.1: *Lantana camara*

SCIENTIFIC CLASSIFICATION

The botanical name of Raimuniya is *Lantana camara*. It belongs to plant family Verbenaceae. 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*

Parts Used: Apart from the whole plant, seeds, stem, root, leaves and flowers are also used.

Synonyms: *Lantana aculeate*, *Camara vulgaris*, *Lantana indica* Roxb., *Lantana salvifolia* Jacq., *Lantana trifolia*, *Lantana orangemene*, *Lantana tiliaefolia* Cham, *Lantana achyranthifolia* Desf., *Lantana montevidensis* Briq., *Lantana viburnoides* Vahl [19, 20, 21].

AYURVEDIC DESCRIPTION

Sanskrit Name: Chaturangi, Vanacchedi

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

Therapeutic Uses: Plant pacifies vitiated condition of vata and kapha [22].

DISTRIBUTION

Local Distribution: Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Bihar, Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Nagaland, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Global Distribution: Asia: Bhutan, China, India, Indonesia, Malaysia, Myanmar, Nepal, Russia, Singapore, Thailand, Vietnam; Africa; Australasia; Europe; North America: Bahamas, Canada, Cuba, Jamaica, Mexico, Puerto Rico, United States of America; South America: Colombia, Venezuela [23].

PHYTOCHEMICAL COMPOSITION

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.

Chemical Constituents

1. β -sitosterol, Betulonic acid, Betulinic acid, Campesterol, Hispidulin, Pectolarigenin, Pectolarin
2. β -pinene, 1,8-Cineole, Cinnamic acid, Dipentene, Ferulic acid, Myristic acid, Palmitic acid
3. Camaraside, Camarinic acid, Camaric acid, Lantanilic acid, Linaroside, Lantanoside, Linaroside, Oleanolic acid, Ursolic acid
4. 8-epiloganin, Geniposide, Icterogenic acid, Isonuomioside A, Isoverbascoside, Lamiridoside, Lantadene A, B,C, Lantanolic acid, Lantic acid, Theveside, Ursolic acid, Verbascoside
5. ρ -Coumaric acid, phydroxybenzoic acid, Vanillic acid. [24]

MEDICINAL AND THERAPEUTIC USES OF LANTANA CAMARA

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

Anti-Inflammatory Activity

Gidwani BK et al. reported the anti-inflammatory activity of aqueous extract of *Lantana camara* in albino rats. Extract treatment (500mg/kg body weight) significantly decreased paw volume in carrageenan induced paw oedema test in rats [25].

Anti-Fertility Activity

De Mello FB et al. Studied 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 [26].

Wound Healing Activity

Gomes de Melo J et al. Studied Wound healing property of ethanol extract of leaf of *Lantana camara* in 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 [27].

Latha LY et al. 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 [28].

Anti Fungal Activity

Srivastava D et al. screened Anti-fungal potential of *Lantana camara* 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 *Lantana camara* exhibited significant antifungal activity against *Alternaria* spores [29].

Tripathi S et al. screened Antifungal activity of ethanol and hot water extract of *Lantana camara* 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%) [30].

Anti-Motility Activity

Sagar L et al. evaluated 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 [31].

Anti-Mutagenic Activity

Barre JT et al. reported the anti- mutagenic activity of *Lantana camara*. 22 β -acetoxylantic acid and 22 β -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 [32].

Hemolytic Activity

Kalita S et al. performed the hemolytic activity of *Lantana camara* aqueous extract and its solvent fractions by modified spectroscopic method at four different concentrations (125, 250, 500, 1000 μ 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 [33].

Anticancer And Antiproliferative Activity

Pour BM et al. reported the Anticancer and antiproliferative activity. Oleanonic acid isolated from *Lantana 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 [34].

Gosh S et al. reported the cytotoxicity effect of Leaves of *Lantana camara* on Vero cell line. In vitro cytotoxicity test was performed by MTT assay. The methanol extract (500 μ g/ml) concentration inhibited the growth of cells 2.5 times less than did Triton 100 \times 1% [35].

Anti-Hyperglycemic Activity

Ganesh T et al. reported 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 [36].

Venkatachalam T et al. 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 [37].

Anti-Ulcer Activity

Thamotharan G et al. Reported 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 [38].

Antifilarial Activity

Mishara N et al. reported 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* [39].

Anti-Oxidant Property

Bhakta D et al. evaluated Antioxidant activity of the leaves of *Lantana camara* 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 [40].

Mayee R et al. reported, the Ethanolic extract of *Lantana 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 studied were carried out by DPPH radical scavenging assay and Nitric oxide free radical scavenging assay. Extract exhibited high antioxidant properties in both the assays [41].

Anti-Bacterial Activity

Barreto FS et al. reported 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* [42].

Ganjewala D et al. studied, 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* [43].

Badakhshan MP et al. screened 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* [44].

Anti-Heminitic Activity

Kumar SM et al. investigated ethanolic extract (10, 50, 100mg/ml concentration) of *Lantana camara* for its anthelmintic activity against *pheretima posthuma* due to presence of tannins which bind to proteins in the GIT of host animal or glycoprotein on the cuticle of parasite and cause death [45].

CONCLUSION

Lantana camera 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. In future, there is enormous scope in research for this plant. Ethnomedical and scientific reports about the medicinal properties of *Lantana camara* represent it as a valuable plant and establishing it as a candidate for the future drug development.

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