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## LANTANA CAMARA: OVERVIEW ON TOXIC TO POTENT MEDICINAL PROPERTIES

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### ABSTRACT

*Lantana camara* is more popular as toxic weed rather than medicinal plant in most of the countries responsible for infesting pastures, grazing lands, orchards and crops like, tea, coffee, oil palm, coconut and cotton, and reduces the economic viability of the crops. This plant can grow even in extreme harsh climatic conditions of tropical and sub-tropical areas and has become naturalized worldwide as an ornamental plant including India. The stem, root and leaves contain many of the bioactive compounds responsible for various therapeutic applications such as cancers, chicken pox, measles, asthma, ulcers, swellings, eczema, tumors, high blood pressure, bilious fevers, catarrhal infections, tetanus, rheumatism, malaria, antiseptic, antispasmodic, carminative and diaphoretic. Besides this, it has some toxic effect by accidental ingestion among the livestock. Best alternate uses of West Indian Lantana started by the people, as it is difficult to eradicate such as household furniture like tables, chairs etc. are made from the stalks.. Present review indicating that *Lantana camara* is a versatile ornamental plant species having economic importance and can be promoted for diversified applications like medicinal and other potential uses.

#### Keywords:

*Lantana camara*,  
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Medicinal property,  
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**INTRODUCTION:** Nature has been a source of medical agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources; many of this isolation were based on the uses of the agents in traditional medicine. The plant-based, traditional medicine system continues to play an essential role in health care, with about 80% of the worlds inhabitants relying on traditional medicines for their primary health care <sup>1</sup>. Among the category of medicinal plant, *Lantana camara* is one, but in India this plant is categorised in poisonous plant as, this plant is among top ten invasive weeds and toxic plant on the earth <sup>2</sup>. In Sri Lanka, also after escaping from the Royal Botanic gardens in 1926 it is a major weed.

Now, this plant is considered as invasive species in many tropical and sub-tropical areas over the 155 plant species. It has been listed as a Category One "Invasive Toxic Species" in Florida by the Florida Exotic Pest Plant Council <sup>3</sup>, and has become a problem in Texas and Hawaii <sup>4</sup>.



*Lantana camara*, also known as Spanish Flag or West Indian Lantana, is a species of flowering plant in the verbena family, Verbenaceae, native to the American tropics<sup>4, 5</sup> includes Mexico, Central America, Greater Antilles, Bahamas, Colombia, and Venezuela. It is believed to be indigenous to the Lower Rio Grande Valley of Texas in the United States. It has become naturalized in tropical and warm regions worldwide including India as an ornamental plant in nineteenth century, locally known by various names such as Marathi: Ghaneri, Tantani, Manipuri: Samballei, Nongballei, Hindi: Raimuniya, Tamil: Unnichi, Kannada: Kakke, Natahu and Telugu: Pulikampa. It can be seen in the wild and along footpaths, deserted fields and farms<sup>6</sup>. West Indian Lantana has been naturalized in the United States, particularly in the

Atlantic coastal plains, from Florida to Georgia, where the climate is close to its native climate, with high heat and humidity<sup>4</sup>.

**Habit:** *Lantana camara* is sometimes known as "Red (Yellow, Wild) Sage", despite its classification in a separate family from sage (Lamiaceae), and a different order from sagebrush (Asterales). *Lantana camara* Linn, (Verbenaceae) is an ornamental weed with aromatic leaves, orange, blue, red, yellow and bright red flowers (**Fig. 1**) and dark blue and black fruits (drupes). The ripe fruit is benign and heavily consumed by birds and frequently eaten by humans in some countries<sup>7</sup>.



**FIG. 1: PATTERN OF FLOWERS, LEAVES AND SEEDS OF LANTANA CAMARA**

*Lantana camara* is a low, erect or sub-scandent, vigorous shrub which can grow upto 2 - 4 meters in height. The leaf is ovate or ovate oblong, 2 - 10 cm long and 2 - 6 cm wide, arranged in opposite pairs. Leaves are bright green, rough, finely hairy, with serrate margins and emit a pungent odour when crushed. The stem in cultivated varieties is often non-thorny.

It is woody, square in cross section, hairy when young, cylindrical and upto 15 cm thick as it grows older. Flower heads contain 20 - 40 flowers, usually 2.5 cm across; the colour of flowers varies from white, cream or yellow to orange pink, purple and red. Flowering occurs between August and March, or all around year if adequate moisture and light are available.

**Habitat:** The diverse and broad geographic distribution of lantana is a reflection of its wide ecological tolerance. It occurs in diverse habitat and on a variety of soil types. Lantana is a perennial shrub generally grows best in open, un-shaded conditions such as wastelands, the edges of rain forests, beachfronts, agricultural areas, grasslands, riparian zones, scrub/shrub lands, urban areas, wetlands and forests recovering from fire or logging. Roadsides, railway tracks and canal banks are favored by the species. It doesn't grow at ambient temperatures below 5°C.

The plant is found at altitudes from sea level upto 2,000 m and can thrive very well under rainfall ranging from 750 to 5000 mm per annum and it grows upto 3 m height. Lantana does not invade intact rain forests, but is found on their margins where natural forests have been disturbed through logging creating gaps and encroaches in the gaps. Further, logging aggravates the condition and allows lantana to spread or become thicker in its growth. It cannot survive under dense, intact canopies of taller native forest species. In India this plant is spread widely over Himachal Pradesh, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Maharashtra and north-eastern States of India<sup>8,9</sup> to the uneven distribution to other parts of country.

**Seed dispersal and Ecological impact:** Fruit dispersal is through frugivorous birds, fox and rodents. Germination rate of fresh seed is generally low, but the germinability gets improved when the seed passes through the digestive system of birds and animals. Seed germination occurs when sufficient moisture is present; germination is reduced by low light conditions. The root system is very strong with a main taproot and a mat of many shallow side roots. Seeds are capable of surviving at hottest fires. High light intensity and soil temperature with moisture will stimulate germination of seeds indicating that clearing of forest areas, inappropriate burning, wind and other disturbances will contribute in spread of the weed.

The efforts to eradicate Lantana have completely been failed. It is resistant to fire, and quickly grows and colonizes in burnt areas. It has become a serious obstacle to the natural regeneration of important native plant species in Southeast Asia, as well as plants in 22 other countries. In greenhouses, lantana is notorious for attracting whitefly. In India they bear

fruit all around year and this appears to have an impact on bird communities<sup>10</sup>. While considered a pest harbourer in Australia, it shelters several native marsupial species from predators, and offers a habitat for the vulnerable exoneura native bee, which nests in the hollow stems of the plant. Lantana threatens natural habitats and native flora and fauna, particularly, in Australia, nineteen endangered and threatened species are under threat due to the lantana habitat.

It infests pastures, grazing lands, orchards and crops like, tea, coffee, oil palm, coconut and cotton, and reduces the economic viability of the crops. In plantations in South-East Asia and the Pacific Islands, besides reducing the productivity of crops, Lantana also interferes with harvesting. The plant has many secondary impacts, especially in tropical countries where it can harbour several serious pests. Malarial mosquitoes in India and tsetse flies in Rwanda, Tanzania, Uganda and Kenya shelter in Lantana bushes and cause serious health problems.

**Phytochemistry:** The constituents of essential oil of *Lantana camara* are Sabiene (19.6-21.5%), 1,8-Cineole (12.6-14.8%),  $\beta$ -caryophyllene (12.7-13.4%),  $\alpha$ -humulene (5.8-6.3%), two rare sesqui terpenoids humulene epoxide-III and 8-hydroxy bicyclo-germacrene<sup>11</sup>, 1,8-cineol (15.8%), sabinene (14.7%) and caryophyllene (8.9%)<sup>12</sup>.

Phytochemical screening revealed that leaf, stem and root of *Lantana camara* contained tannin, catechin, saponin, steroids, alkaloids, phenol, anthroquinone, protein, several tri-terpenoids, flavonoids, alkaloids, glycosides and reducing sugar<sup>13</sup> which are mainly responsible for exerting diverse biological activities.

**Pharmacological activities:** Lantana is basically used as an herbal medicine since long back reflected through documents in various literatures. All parts of this plant have been traditionally used for several ailments throughout the world. 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. Beside this traditionally, Lantana is considered to be antiseptic, antispasmodic, carminative and diaphoretic agent<sup>14</sup>.

The leaves of this plant has been used as an antitumoral, antibacterial, antihypertensive agent<sup>15, 16</sup>, tonic and expectorant, while roots used for the treatment of malaria, rheumatism, and skin rashes<sup>17</sup>. Infusions of the leaves and other parts are used as an anti-inflammatory<sup>16, 18</sup> and added to baths as an anti-rhumatic agent. The methanolic extract of Lantana leaves shown healing potential against gastric ulcers and also prevents development of duodenal ulcers in rats<sup>19</sup>. The extracts from leaves have antipyretic and analgesic properties<sup>14, 16</sup>. Extracts of lantana leaves have shown strong insecticidal and antimicrobial activity in numerous experiments<sup>20</sup>; additionally leaves oil, stem and roots have sufficient bactericidal activity against pathogenic strains<sup>14, 21</sup>.

Lantana extract is powerful febrifuge<sup>22</sup> as the leaves and some other parts of lantana are poisonous, care must be taken when it is used medicinally. The lantana root extracts are the most toxic part and it has anticancer activity<sup>23</sup>. However, leaf and flower extracts obtained using different solvents shown to have larvicidal activity<sup>24, 25, 26</sup>; flowers of the plant showed mosquitoes repellent activity<sup>27, 28</sup>, thus flowers can be used as a mosquito control agent<sup>25</sup>. Additionally, storing potatoes with Lantana leaves nearly eliminates damage caused by *Phthorimaea operculella* Zeller, the potato tuber moth<sup>20</sup>.

**Toxicity:** West Indian Lantana has been reported to make animals ill after ingestion. Its foliage contains the toxic pentacyclic triterpenoids called lantadenes. Major lantadenes are A, B, C and D and minor like reduced lantadene A and reduced lantadene B. Lantadene A and Lantadene B cause hepatotoxicity and photosensitivity in grazing animals such as sheep, goats and bovines<sup>29</sup> and horses<sup>30</sup>. The ingestion of the plant parts can cause pink nose disease, jaundice and muzzle in cattle. Livestock foraging on the plant has led to widespread losses in the various countries including India<sup>29</sup>. Heavy out-breaks of Lantana poisoning can occur mostly during drought. The berries are edible when ripe. Ingestion of plant (including unripe berries) is not associated with any significant human toxicity<sup>31</sup>.

Lantana toxicity resulted into decrease in hepatic mitochondrial protein content (guinea pigs). The phospholipid to protein ratio did not change but it caused marked increase in the cholesterol to protein ratio and the cholesterol to phospholipid ratio. Further, enzyme activities of succinic dehydrogenase, glutamate dehydrogenase, cytochrome oxidase and Mg<sup>2+</sup>-ATPase increased, while the activity of NADH-ferricyanide reductase remained unaffected<sup>32</sup>.

**Potential uses:** Some communities have started alternate uses of West Indian Lantana, as it is difficult to eradicate. Some household furniture, such as tables and chairs are made from the stalks, or the small branches are bundled together to make brooms<sup>6</sup>, and used in some areas as firewood and mulch. In some countries it is planted as a hedge to contain or keep out livestock. The stems of Lantana, if treated by the sulphate process, can be used to produce writing and printing paper. Its other potential uses include, making baskets and temporary shelters and fuel for cooking and heating.

In some areas, Lantana may provide shelter and vital winter food for many native birds. A number of endangered bird species utilize Lantana thickets when their natural habitat is unavailable. Apart from benefiting some bird species, Lantana is a major nectar source for many species of butterflies and moths. The plant can prevent soil compaction and erosion and is a source of organic matter for pasture renovation. In Australia, ornamental Lantana is an excellent source of income in the nursery sector.

**CONCLUSION:** Lantana is a one of the popular toxic plant and major weed in many of the countries. It can grow vigorously invading many areas even at adverse climatic conditions in tropical and sub-tropical areas damaging field crops.

It has many therapeutic applications indicating, its versatile nature. In last decades few efforts has been made for scientific validation of the folklore but still these efforts are insufficient. A further study is still requiring for isolation and purification of active principle and scientific revalidation of medicinal properties by collecting this plant from different parts or pockets of country.

Lantana eradication is difficult task hence, eradication programme should be stopped. Lantana plant should be promoted and cultivated in area where other plants are difficult to grow or in harsh environmental conditions. Efforts should be made to explore this plant for its potential medicinal utility and development into healthcare products for betterment of animals and humans which would be effective, easily available, and low cost, and alternatively be used as household commodities in areas where this plant is abundant.

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