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A weed Lantana camara L. and its potential in Medicinal field

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Abstract

Lantana camara is one of the most well-known dangerous weeds that can be found anywhere. Scientifically named as *L. camara* var. aculeata, this plant's lethal red flower variant is often found in tropical and subtropical areas. It is well known that *Lantana camara* is a frequent element in many traditional remedies and may be used to treat a variety of diseases. In recent decades, scientists and researchers from all over the world have carefully examined the chemical makeup of the entire plant of *L. camara* as well as its biological and pharmacological activities. Consequently, a variety of diseases are treated using diverse plant parts. Asthma, ulcers, swellings, eczema, tumors, excessive blood pressure, bilious fevers, catarrhal infections, tetanus, rheumatism, and malaria have all been treated with plant extracts in folk medicine. Professional studies have looked at the medical benefits of *Lantana Camara*, including its antioxidant, antipyretic, Larvicidal, antibacterial, antimicrobial, insecticidal, wound-healing, and anti-hyperglycemic capabilities. Thus this article briefs about the medicinal and traditional uses of the weed that is *Lantana camara*.

Key words : *Lantana camara*, Tradition, Antipyretic, Diseases, Antioxident.

Veterinarians are quite concerned about poisonous plants due to the harm they cause to cattle, including mortality and lower output[9,43]. The strength of the toxic effects caused by poisonous plants depends on the kind, quantity, and kind of toxic component taken as well as the animal's species, age, size, and physical condition[44]. After habitat destruction and the negative effects they have on livestock, these invasive species are considered to be the second greatest danger to biodiversity and the ecosystem[5,11,33,55]. Due to their evolution into predators, these invasive plants are at responsible for both plant and

animal diseases[6,12,13].

The most well-known noxious[31] and invasive weeds[2,32,34,49,50] among poisonous plants is *L. camara* shown in figure 1. The genus *Lantana camara* L. was described by Linnaeus in 1753 and is an important part of the Verbenaceae family that produces essential oils in addition to acting as an attractive and therapeutic plant. It has 600 different species that are found worldwide. The name *Lantana camara* is derived from the Latin word *lento,* which means to bend[15]. The majority of it is made up of seven species, six of which have been documented from America and one from Ethiopia[24]. *Lantana camara*, which is indigenous to the South, Central, and Caribbean islands, has been discovered in Brazil, Florida, Jamaica, Mexico, and Trinidad[2]. Although the species is common in the Neotropics, it has not been discovered in the Old World[7,37]. In addition, one species of *Lantana camara* from India and several others are assumed to have originated in Africa[2,7,21]. This plant has branches that reach a height of two to three meters and are covered in curving prickles. When fully grown, the leaves are rough and unpleasant odour. They are rounded at the base, rectangular, cuneate, rugose, and crenate at the top[43]. The fruits first have a greenish colour before turning dark blue. The ripe dark blue fruits are delicious and widely enjoyed by both humans and birds, but the young green fruits are dangerous[43].

Lantana camara's wide-ranging ecological tolerances are reflected in its extensive and diverse distribution. The species can be found in a range of habitats, such as wastelands, the edges of rainforests, beachfronts, and woods that have been burned or harvested[47]. According to Sharma *et al*.[42], Kohli *et al*.,[28] and Dogra *et al*.,[10], the plant also grows well in disturbed areas including canals, railway lines, and waysides. Anthropogenic activity promotes the invasion's spread and worsens it[7]. A successful establishment must be able to grow in a variety of climatic conditions and be unrestricted by

Figure 1. Weed *Lantana camara* L.

temperature or rainfall. These are the two essential elements of a successful establishment. The purpose of this article is to inform readers on the history of the plant and its valuable constituents.

Traditional uses :

Lantana camara has been used to treat a variety of illnesses in many parts of the world[36]. In Central and South America, the leaves were applied topically to treat wounds, chicken pox, and measles. The plant's components were used to cure colds, rheumatism, high blood pressure, and asthma.[41] Children were given the powdered root in milk to alleviate stomachaches in Ghana, while an infusion made from the entire plant was used to treat bronchitis[41]. In Asian countries, it was usual practise to cure cuts, rheumatism, ulcers, and intestinal worms using leaves. The steroid lancamarone, which is generated from leaves, is reported to have cardiac tonic properties[44] and that the alkaloid lantamine, which was isolated from the stem, bark, and roots, showed quinine-like antipyretic and antispasmodic properties[39]. In India, the plant's leaves are prepared for tea, and the resulting concoction is applied to cuts as a lotion and as a cough remedy. Utilizing the crushed leaves to treat wounds, ulcers, and swellings[52].

Phytochemical composition :

The phytochemical composition of *L. camara* has been the subject of a great research during the last few decades. Major phytochemical groups reported to be present in different parts of *L. Camara* include essential oils, phenolic compounds, flavonoids, oligosaccharides, carbohydrates, proteins, phenyl ethanoid, alkaloids, glycosides, iridoid glycosides, steroids, triterpens, sesquiterpenoides, quinine, saponins, and tannin[4,25,26,51].

Ethno pharmacology :

As stated in table-1, a medicinal plant named *Lantana camara* L. is used to treat a variety of illnesses all around the world[15]. Boiling its leaves yields tea and the decoction can be used into a lotion to treat wounds, tetanus, malaria, cough, and other conditions. The infusion of the entire plant is used to cure bronchitis in Ghana, while the powdered roots mixed with milk are used to alleviate stomach aches[23]. The major steroid lancamarone, which was extracted from the leaves of *L. Camara*, has been shown in a previous study to have cardiac tonic properties[22] According to Yadav and Tripathi[54], it has historically been used to treat stomachaches and as an insecticide. In several Asian countries, the plant's leaves have been used to cure wounds, ulcers, and rheumatisms[40].

Antioxidant Activity :

The reducing and scavenging activities present in the plants leaf part works as an antioxidant properties. According to Bhakta and Ganjewala[4], the antioxidant activity of the leaves in positions I and III of the methanolic extract were significantly higher than that of the leaves in positions IV to V. The antioxidant capacity of a methanolic extract of *Lantana camara* was evaluated using the DPPH radical scavenging activity and the nitric oxide free radical scavenging method[30].

Table-1 Chemical composition of *Lantana camara* along with their mechanism of action

S.no.	Action	Triterpenoids	References
1.	Hepatotoxic	LA, LB, LC, RLA and Icterogenin	Brown *et al*., 1963; Johns *et al*., 1983a; Sharma *et al* 1991; Verma *et al*., 1997; Wachter *et al*., 2001; Khan *et al*., 2003; Srivastava *et al*., 2005; Kong *et al*., 2006; Parimoo *et al*., 2015
2.	Antitumor	LA, oleanolic acid, ursolic acid, Camaraside and Lantalucratins A-F	Brown & Rimington, 1964; Seawright & Hardlicka, 1977; Mahato *et al*., 1994; Deena & Thoppil, 2000; Ghisalberti, 2000; Hayashi *et al*., 2004; Gomes de Melo *et al*., 2010; Bisi-Johnson *et al*., 2011
3.	Allelopathy	LA, Umbelliferone, Hydroxycoumarin, 6-methylcoumarin, Salicylic acid, gentisic acid, Vanillic acid and Quercetin	Brown *et al*., 1963; Johns *et al*., 1983a; Singh *et al*., 1989; Sharma *et al* 1991; Verma *et al*., 1997; Wachter *et al*., 2001; Kong *et al*., 2006; Verdeguer *et al*., 2009
4.	Protein kinase C inhibitor	Verbascoside	Herbert *et al*., 1991
5.	Nematicidal	Camarinic acid, Linaroside and Lantanoside	Siddiqui *et al*., 1995; Begum *et al*., 2000
6.	Antiprotozoal	Triterpnes from *Lantana montevidensis*	Mohameda *et al*., 2016
7.	Antimicrobial and antibacterial activity	LA, LB, oleanolic acid, ursolic acid, 4-Epihede-ragonic acid and 24-Hydroxy-3-oxours-12-en-28-oic acid	Brown *et al*., 1963; Sharma *et al* 1991; Inada *et al*., 1995, 1997; Verma *et al*., 1997; Wachter *et al*., 2001; Kong *et al*., 2006; Kumar *et al*., 2006; Barreto *et al*., 2010; Hussain *et al*., 2011; Sousa & Costa, 2012
8.	Anxiolytic action	(Psychiatric disorder)	UASG Kessler *et al*., 1994; Awad *et al*., 2009; Kazmi *et al*., 2013
9.	Antimutagenic	22beta-Dimethylacrylo-yloxylantanolic acid	Barre *et al*., 1997; Mello *et al*., 2005
10.	Anti-hyperlipidemic	Oleanolic acid and ursolic acid	Hart *et al*., 1976b; Liu, 1995, Liu, 2005; Mishra *et al*., 1997; Verma *et al*., 1997; Chen *et al*., 2005, Chen *et al*., 2006

11.	Antitubercular	LA	Seawright & Hardlicka, 1977; Verma *et al*., 1997; Wachter *et al*., 2001; Kong *et al*., 2006
12.	Hepatoprotective	Oleanolic acid and ursolic acid	Hart *et al*., 1976b; Johns *et al*., 1983b; Singh *et al*., 1990, 1991; Liu, 1995; Siddiqui *et al*., 1995
13.	Leukotriene inhibitor	Oleanonic acid	Hart *et al*., 1976b; Johns *et al*., 1983b; Giner-Larza *et al*., 2001
14.	Anti-inflammatory	Oleanolic acid, ursolic acid and Oleanonic acid	Hart *et al*., 1976b; Johns *et al*., 1983b; Liu, 1995; Verma *et al*., 1997; Giner-Larza *et al*., 2001; Benites *et al*., 2009; Ghosh *et al*., 2010; Hussain *et al*., 2011; Sousa & Costa, 2012
15.	Antithrombin	5,5-Trans-fused cyclic lactone containing euphane triterpenoids	O'Neill *et al*., 1998; Weir *et al*., 1998
16.	Antiviral	LA, LB, LC, RLA, RLB and 22beta-Hydroxy-3 -oxolean-12-en-28-oic acid	Johns *et al*., 1983a; Inada *et al*., 1995
17.	Antiproliferative	Apigenin, Cirsilineol, Eupafolin, Eupatorin and Hispidulin	Nagao *et al*., 2002

Antimicrobial activity :

Flower extract of the plant *Lantana camara* has potent antibacterial activity. According to Ganjewala *et al*.,[14], *Lantana camara* flowers in yellow, purple, red, and white all demonstrated strikingly similar antibacterial qualities. Chloroform extract of *Lantana camara* was effective against all three strains of Mycobacterium tuberculosis[28]. According to a recent study by Ashish Saraf [38], *Lantana camara* leaf extracts are efficient against a variety of gramme positive and gramme negative bacteria. The extract from the flower, leaf, stem, and root of the *Lantana camara* plant has demonstrated antibacterial activity against E. coli, staph. aureus, p. aeruginosa, and s. saprohiticus[29].

Antiinflammatory activity :

Aqueous *L. camara* extract was discovered to have anti-inflammatory qualities in albino rats. Carrageenan-induced paw oedema in rats was tested, and extract therapy (500mg/kg body weight) significantly decreased the volume of the paws[19].

Anti-mutagenic activity :

22-acetoxylantic acid and 22-dimet-

hylacryloyloxy lantanolic acid from *L. camara* showed antimutagenic characteristics. The micronucleus test was performed on Swiss mice to evaluate their antimutagenicity. Both medications showed potent anti-mutagenic activity against Mitomycin C-induced mutagenesis in mice.[3]

Antipyretic activity :

Due to the antipyretic qualities of *Lantana camara,* its ethanolic and ethyl acetate extract starts decreasing body temperature after 1.5 hours.[45]

Antiulcer genic activity :

The methanol extract of *L. camara* leave was found to have antiulcer genic activity on the aspirin, ethanol, and cold resistance stress induced stomach ulcers in rats. Rats pre-treated with the extract (200 and 400 mg/kg body weight) were significantly protected from aspirin-induced, ethanol-induced, and cold restraint stress-induced ulcers. The extract generated dose-dependent antiulcer genic efficacy in every model.[48]

Hemolytic activity :

The hemolytic activity of the *L. camara* aqueous extract and its solvent fractions was evaluated at four different concentrations (125, 250, 500, and 1000 g/ml) using a modified spectroscopic approach. The hemolytic activity of the aqueous extract and its solvent components towards human erythrocytes was extremely low. When observing the hemolytic activity of the various extracts, the following sequence was noticed: chloroform fraction > hexane and ethyl acetate fraction (50:50) > aqueous extract > ethanol fraction >methanol fraction.[25]

Anticancer and antiproliferative activity :

The anticancer activity of oleanonic acid produced from *L. camara* (lymphoma) was tested on the human cancer cell lines A375 (malignant cutaneous melanoma), Hep 2 (epidermoid laryngeal carcinoma), and U937. Oleanonic acid showed promising cytotoxicity against A375 cells[17]. *L. camara* leaves reportedly have a cytotoxic effect on the Vero cell line. An in vitro cytotoxicity test was performed using the MTT assay. The 500 g/ml concentration of the methanol extract inhibited cell growth 2.5 times less than Triton[35]. It has been demonstrated that *L. camara* leaves exhibit antiproliferative effects on the laryngeal cancer cell line HEp-2 and the lung cancer cell line NCI-H292. The anti-proliferative effects of a methanol extract of *L. camara* leaves were ineffective against NCI-H292 cells (% viable cells=25.80.19)[20].

According to scientific and ethno medical research on *L. camara's* medicinal properties, it is a beneficial plant and can be a possible target for potential drug development. Herbal items are frequently regarded as emblems of protection in contrast to synthetic products, which are thought to be hazardous to human life and the environment. Thus herbs have been valued for their medicinal properties. However, more frequent research is being done on the pharmacological and phytochemical characteristics of numerous plant constituents. The potential of *Lantana camara* as a medicinal plant is supported by the current study. To fully understand the remarkable potential of *Lantana camara* plants, more

research can be done. Several research methods, including HPTLC, HPLC, FTIR, NMR, and UV spectrophotometer analysis, can be used to further examine the active compounds in Lantana camara plants.

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