

RESEARCH ARTICLE

Lantana camara from forest edge towards pharmacy front: An overview

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Manuscript details:	ABSTRACT
<p>Available online on http://www.ijlsci.in</p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p>Editor: Dr. Chavhan Arvind</p> <p>Cite this article as: Gurubaxani Sevak B, Ganatra Sunil H and Uparkar Mamta S (2016) <i>Lantana camara</i> from forest edge towards pharmacy front: An overview <i>Int. J. of Life Sciences</i>, A6: 137-140.</p> <p>Acknowledgement The authors express gratitude to the Director Institute of Science, Nagpur for providing the necessary facilities and to Rashtrasant Tukadoji Maharaj Nagpur University for the fund support.</p> <p>Copyright: © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>World pharma is moving from synthetic therapeutically important drugs with many a side effects towards naturally inspired farm based, forest based herbal products showing potential biological activity against variety of ailments along with viability as recognized very early by Ayurveda and Unani traditional folk -medical practitioners. One such plant with array of medicinal properties is <i>Lantana camara</i> which shows marvelous recovering effects against cold, fever, stomachache, diarrhoea and is also implicated against prevention and cure of serious diseases such as cancer. Scientists' around the globe studied the pharmacological as well as biological properties of this plant as a promising candidate for modern drug discovery. The present review reveals the older facts as elaborated by researchers and urge for further investigation with a quest for multitarget, non-toxic, cheap medicine with little side effects.</p> <p>Keywords: <i>Lantana camara</i>, herbal products, pharmacological, multitarget.</p>
	<h3>INTRODUCTION</h3> <p><i>Lantana camara</i> is a weed that grows near forest edges, agricultural fields, grasslands. It is native of central and South America and introduced in many parts of the world as a perennial ornamental shrub of garden courtyard. It is an angiosperm belonging to family Verbenaceae. In India, it is introduced around 19th century in areas with moderate temperature and well drained soils but can also survive on sandstone derived soils if the plant gets sufficient moisture throughout its growth period. Different Indian languages got different names for the plant namely, Raimuniya (Hindi), Chaturangi (Sanskrit), Ghaneri (Marathi), Gandhati (Gujarati), Punjphuli (Punjabi) (Ross, 2001).</p> <p><i>Lantana camara</i> has high medicinal value as recognized by Indian traditional folk. Recent scientific investigations further explored the therapeutic importance of the plant with multiple pharmacological activities. Every part of the plant has one or other active medicinal constituent. The present article documents journey of <i>Lantana camara</i> as a course weed of neotropics and attractive flowering garden plant towards plant of clinical importance for the development of newer leads in modern medicine (Ross, 2001).</p>

Medicinal Properties of *Lantana camara*

Wound Healing Activity

Topical application of ethanol extract of *L. camara* leaf in adult male Wistar rat accelerated the wound healing capacity which is confirmed by histological analysis (Abdulla, 2009). Preclinical study on rats suggested that when aqueous extract of *L. camara* (100 mg/kg/day) is topically administered wound healing enhanced with 98% wound contraction, collagen synthesis and decrease in mean healing time (Nayak, 2009)

Anti-Inflammatory Activity

In a carrageenan induced paw oedema test on albino rat, aqueous extract of aerial parts (500 mg/kg) of *L. camara* was found to be anti-inflammatory as indicated by significant decrease in paw volume (Gidwani, 2009).

Effect on red blood cell

The interaction of drugs with the membrane of red blood cells can be evaluated by osmotic fragility assay and morphometric analysis. When blood samples were incubated with aqueous extract of *L. camara* leaves (10 g/ml), significant ($p < 0.05$) increase of hemolysis and modification in morphology of red blood cells was verified (Maiworm, 2008)

Anticancer activity

Anticancer activity against three human cell lines is tested viz. A375 (malignant skin melanoma), Hep2 (epidermoid laryngeal carcinoma) and U937 (lymphoma). It was found that oleanonic acid isolated from *L. camara* is effective against A375 cells (Ghose and Sharma, 2010). Methanolic extract of *L. camara* leaves exhibited antiproliferative activity against NCI-H292 cells (% living cells = 25.8 ± 0.19) (Gomes, 2010)

Antibacterial activity

The essential oil of *L. camara* showed antibacterial activity against Gram positive *Bacillus cereus*, *Bacillus subtilis* and *Staphylococcus aureus* but Gram negative *Klebsiella pneumonia* and *Pseudomonas aeruginosa* were not susceptible at lower concentrations (Saikia and Sahoo, 2011). The petroleum ether extract of *L. camara* leaves has shown profound activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis* and *Staphylococcus faecalis* strains of bacteria (Pradhan, 2012). The *in vitro* antibacterial activity by

microdilution method had shown that the ethanolic extract exhibited antimicrobial activity against *Staphylococcus aureus*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Vibrio cholerae*, *Escherichia coli* and two (Barreto, 2010)

Hemolytic activity

Hemolytic activity of the leaves of *L. camara* aqueous extract and its hexane and ethyl acetate fraction (50:50), chloroform fraction, methanol fraction and ethanol fraction was carried out against normal human red blood cells. A low to mild hemolytic effect toward human erythrocytes was observed. Methanolic fraction of the aqueous extract (at dose 1000 µg/ml) has minimum hemolytic activity ($4.62 \pm 0.23\%$) with an IC₅₀ value 12332.0 µg/ml on the other hand the chloroform fraction (at dose 1000 µg/ml) have highest hemolytic activity (20.51 ± 0.98) with an IC₅₀ value 2739.8 µg/ml. Hemolytic percentage was found to be increasing with increase in dose (Kalita, 2012)

Antifertility activity

Fertility of male rats was examined for the effects of a hydroalcoholic extract from leaves of *L. camara* and it was found that overall weight or internal organ weight remain unaffected but it interfered with the sperm count, sperm production, and sperm morphology (De Mello, 2003)

Antidiabetic activity

In alloxan-induced diabetic rats oral administration of methanolic extract of *L. camara* leaves showed tremendous ($P < 0.01$) decrease in blood glucose level in dose dependent manner. Treatment with extract (400 mg/kg) decreased blood glucose concentration to 121.94 mg/dl. Body weight significantly ($P < 0.05$) increased to normal after treatment with extract (Ganesh, 2010).

A new stearyl glucoside of ursolic acid, urs-12-en-3β-ol-28-oic acid 3β-D-glucopyranosyl 1-4'-octadecanoate and other compounds as isolated from the leaves of *Lantana camara* L. showed significant decrease in blood glucose concentration in streptozotocin induced diabetic rat (Kazmi, 2012)

Antimotility activity

Methanolic extract of *L. camara* shows antimotility effect against neostigmine as promotility agent which confirmed anticholinergic effects due to constituents in plant and has wide utility in secretory and

functional diarrhoea. The results were further tested by administering plant extract intra peritoneally against castor oil induced diarrhoea model in mice which significantly reduced fecal output.

Antiuro lithiatic activity

Ethylene glycol and ammonium chloride induced calcium oxalate Urolithiasis in male albino rats was administered with ethanolic extract of the leaves of *L. camara* which significantly reduced the deposition of calcium oxalate and urinary excretion of calcium oxalate and creatinine confirmed antiuro lithiatic activity of the plant (Sagar, 2012)

Antimutagenic activity

The anti mutagenicity test was performed by micronucleus test in Swiss mice. Compounds isolated from leaves of *L. camara* such as 22 β -acetoxylantic acid and 22 β -dimethylacryloyloxylantanolic acid showed high antimutagenic activity in Mitomycin C induced mutagenesis in mice (Barre, 2009)

Antiulcerogenic activity

Methanolic extract of leaves of *L. camara* exhibited antiulcerogenic activity on aspirin induced, ethanol induced and cold resistant stress induced gastric lesions in rats. Extract of 200 and 400 mg/kg body weight showed significant protective effect in aspirin induced, ethanol induced and cold restraint stress induced ulcers in rats (Thamotharan, 2010)

Antioxidant activity

Investigations revealed that leaf extracts of *L. camara* show high antioxidant effect however younger leaves exhibited strong antioxidant activity than the matured leaves. Ethanolic extract of *L. camara* was reported with 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 done by 1, 1-diphenyl-2-picrylhydrazyl radical scavenging assay and Nitric oxide free radical scavenging assay. Extract exhibited high antioxidant properties in both the assays (Mayee and Thosar, 2011; Bhakta and Ganjewala, 2009).

Antifungal activity

Ethanolic extract of *L. camara* was found efficient against would destroying fungi while hot water extract was ineffective against the test fungi (Tripathi, 2009).

L. camara was tested against *Alternaria* sp. which is

responsible for different plant diseases especially in vegetable plants. The antifungal activity was carried out by food poison plate method at three different concentrations of the extract namely, 10 mg/ml, 15 mg/ml and 20 mg/ml. *L. camara* exhibited significant antifungal activity against *Alternaria* sp at 20mg/ml (Srivastava and Singh, 2011)

Mosquito controlling activity

Essential oils from the leaves of *L. camara* were found adulticidal against vectors of malaria (*An. culicifacies*, *An. stephensi*), filariasis (*Cx. quinquefasciatus*) dengue, dengue haemorrhagic fever, yellow fever and chikungunya (*Ae. aegypti*) (Dua, 2010).

L. camara showed repellent potential against *Aedes aegypti* when the oil is applied to the upper surface of the human forearms and is protective in alcoholic solvent for more than 3 hours (Bhargava, 2013).

Mosquito larvicidal activity of methanolic and ethanolic extract of leaves and flowers of *L. camara* is found against 3rd and 4th instar larvae of mosquito against species *Aedes aegypti* and *Culex quinquefasciatus*. With 1.0 mg/ml concentration of extracts of *Lantana camara* maximum mortality as observed in *Aedes aegypti* exposed for 24 hours however in *Culex quinquefasciatus* the mortality maximum when the concentration increased to 3.0mg/ml (Kumar and Maneemegalai, 2008)

CONCLUSION

In view of above account, the plant showed active principles as an antimicrobial, fungicidal, insecticidal with immunodepressant and anticancer properties. *Lantana* oil is popular against skin infections and used for the cure and care of leprosy patients. The reported phytochemicals such as terpenes, flavones, steroids and glycosides merits further research on applications of this invasive weed. Though it possess several qualities of immense benefits to human beings sometimes the plant is thought to be deleterious to grazing animals due to certain active toxic constituents. Further investigations regarding toxicity, efficacy and clinical safety needs to be carried out so as to emerge *Lantana camara* as a source of alternative and complementary drug with spectrum of preventive and curative potentialities against dreadful diseases of the time.

REFERENCES

- Abdulla MA (2009) Acceleration of wound healing potential by *Lantana camara* leaf extract in experimental rats. Research Journal of Medical Sciences, 3 (2): 75-79.
- Barre JT (2009) A bioactive triterpene from *Lantana camara*. Phytochemistry, 45 (2):321-324.
- Barreto FS (2010) Antibacterial activity of *Lantana camara* Linn and *Lantana montevidensis* Brig extracts from Cariri-Ceará, Brazil. Journal of Young Pharmacists, 2 (1):42-44.
- Bhakta D, Ganjewala D (2009) Effect of leaf positions on total phenolics, flavonoids and proantho-cyanidins content and antioxidant activities in *Lantana camara* (L). Journal of Scientific Research, 1 (2): 363-369.
- Bhargava S (2013) Repellent activity of essential oil and leaf extract of *Lantana camara* in laboratory condition. International Journal of Theoretical and Applied Sciences, 5(1): 170-174.
- De Mello FB (2003) Effects of *Lantana camara* (Verbenaceae) on rat fertility. Veterinary and Human toxicology, 45 (1): 20-23.
- Dua VK (2010) Adulticidal activity of essential oil of *Lantana camara* leaves against mosquitoes. Indian Journal of Medical Research, 131: 434-439.
- Ganesh T (2010) Pharmacognostic and anti-hyperglycemic evaluation of *Lantana camara* (L.) var. aculeate leaves in alloxan-induced hyperglycemic rats. International Journal of Research in Pharmaceutical Sciences. 1 (3): 247-253.
- Ghose S, Sharma M (2010) Anti-inflammatory and anticancer compounds isolated from *Ventilago madraspatana* Gaertn, *Rubia cordifolia* Linn, and *Lantana camara* Linn. Journal of Pharmacy and Pharmacology, 69 (9):1158-1166.
- Gidwani BK (2009) Analgesic, anti-inflammatory and antihemorrhoidal activity of aqueous extract of *Lantana camara* Linn. Research Journal of Pharmacy and Technology, 2 (2): 378-381.
- Gomes de Melo J (2010) Antiproliferative activity, antioxidant capacity and tannin content in plants of semi-arid Brazil. Molecules, 15 (12): 8534-8542.
- Ivan A Ross (2001) Medicinal plants of the world: Chemical constituents, traditional and modern medicinal uses, 2nd ed. Totowa, NJ, Humana press Inc, 1: 289-290. <http://herbsgujarat.tripod.com>
- Kalita S (2011) Phytochemical composition and *in vitro* hemolytic activity of *Lantana Camara* L. (Verbenaceae) leaves. Pharmacologyonline 1: 59-67.
- Kazmi I (2012) Anti-diabetic potential of ursolic acid stearyl glucoside: A new triterpinic glycosidic ester from *Lantana camara*. Fitoterapia, 83 (1): 142-146.
- Kumar MS, Maneemegalai S (2008) Evaluation of Larvicidal Effect of *Lantana Camara* Linn. against mosquito species *Aedes aegypti* and *Culex quinque fasciatus*. Advances in Biology Research, 2 (3-4): 39-43.
- Maiworm AI (2008) Osmotic and morphological effects on red blood cell membrane: action on aqueous extract of *Lantana camara*. Brazilian Journal of Pharmacognosy, 18 (1): 42-46.
- Mayee R, Thosar A (2011) Evaluation of *Lantana camara* Linn. (Verbenaceae) for antiurolithiatic and antioxidant activities in rats. International Journal of Pharmaceutical and Clinical Research, 3 (1):10-14.
- Nayak BS (2009) Evaluation of wound healing activity of *Lantana camara* L. - a preclinical study. Phytotherapy Research, 23 (2): 241-245.
- Pradhan RR (2012) Pharmacognostical, phytochemical and antimicrobial studies on the leaves of *Lantana camara* Linn. Der Pharmacia Lettre, 4 (6):1648-1656.
- Sagar L (2005). Evaluation of antimotility effects of *Lantana camara* L. var. aculeata constituents on neostigmine induced gastrointestinal transit in mice. BMC Complementary and Alternative Medicine, 5: 18.
- Saikia AK, Sahoo RK (2011) Chemical composition and antibacterial activity of essential oil of *Lantana camara* L. Middle-East Journal of Scientific Research, 8 (3): 599-602.
- Srivastava D, Singh P (2011) Antifungal potential of two common weeds against plant pathogenic fungi-*Alternariasps*, Asian Journal of Experimental Biological Sciences, 2 (3):525-528.
- Thamotharan G (2010) Antiulcerogenic effects of *Lantana camara* Linn. leaves on *in vivo* test models in rats. Asian Journal of Pharmaceutical and Clinical Research, 2010; 3 (3):57-60.
- Tripathi S (2009) Potential of *Lantana camara* Linn. Weed against wood destroying fungi. Indian Forest, 135 (3): 403-411.