CODEN (USA)-IJPRUR, e-ISSN: 2348-6465

Original article

Phytochemical Constituents and Antimicrobial Activity of *Lantana camara* Leaf Extract

Sudha R[1,*], Afrin Esha S M[2], Akshaya K[2], Dhivya E[2], Ganesh kumar E[2], Harshini C [2]

[1]Associate Professor, Dept of Pharmaceutics, Kamarajar College of Pharmacy, Chidambaram, Tamilnadu, India.
[2] Kamarajar College of Pharmacy, Chidambaram, Tamil nadu, India

ARTICLE INFO:
Received: 25 Dec 2025
Accepted: 12 Jan 2026
Published: 28 Feb 2026

Corresponding author *
Sudha R,
Associate Professor, Dept of Pharmaceutics, Kamarajar College of Pharmacy, Chidambaram, Tamilnadu
E-mail: sspm85@gmail.com

ABSTRACT:

Lantana camara., belonging to the family Verbenaceae, is a widely distributed medical shrub native to central and south America and now naturalized in many tropical and subtropical regions, including India. Although considered as an invasive weed, the plant possesses significant pharmacological properties due to the presence of diverse phytochemicals in its leaves. The leave of lantana camara is rich in alkaloids, flavonoids, tannins, saponins, terpenoids, glycosides, steroids, and phenolic compounds, which contribute to its antimicrobial, anti-oxidant, anti-inflammatory and wound healing activities. Various extraction techniques, particularly the maceration method using methanol and ethanol as solvent, are commonly employed to obtain crude leaf extracts. Phytochemical screening is performed using standard qualitative chemical test to identify the presence of secondary metabolites. Antimicrobial activity of leaf extract is evaluated using methods such as disc diffusion, agar well diffusion, and broth dilution technique to determine the zone of inhibition, Minimum Inhibitory Concentration (MIC), and Minimum Bactericidal Concentration (MBC). Several studies have demonstrated significant antibacterial activity of lantana camara leaf extracts against pathogens such as *Staphylococcus aureus, Esherichia coli,* and *salmonella typhi*, along with antifungal activity against *Candida albicans* and *Aspergillus species*. Despite is known toxicity in livestock due to lantadenes, controlled and scientific utilization of leaf extracts offers promising therapeutic potential. Further research is required for isolation of active compounds and development of novel herbal antimicrobial agents.

Keywords: *Lantana camara*, pharmacological, antibacterial, *Candida albicans*.

1. INTRODUCTION

Medicinal plants is a key source of bioactive compounds that help to prevent various disease. The antibiotic resistance issue is increase, more peoples fallowing the plant-based drugs as non-toxic and effective alternatives. Lantana camara is a medicinal plant identified antimicrobial, anti-inflammatory and antioxidant properties [1]. *Lantana camara* have been an essential part of traditional health care systems although the world for centuries. They proceed to important source of medicinal agents. This issue has led to increase requirement for alternative treatment that are non-toxic, cost-effective, and more effective for the environment. Lantana camara is an evergreen shrub, it is originally from tropical America but has become widespread as invasive species. Traditionally, it has been used to treat cancer, measles, asthma, ulcers, wounds and malaria. In phytochemical test alkaloids, flavonoids, steroids, triterpenoids including oleanolic acid, ursolic acid, betulinic acid, camarinic acid and lantanolic acid [2]. These compounds have demonstrated antimicrobial properties. Because it has a wide range of bioactive compounds, *Lantana camara* is seen as a potential source for new antimicrobial drugs. The fast rise of antibiotic resistant of microorganisms has led to a global need for new antimicrobial agents. Medicinal plants used in traditional medicine are seen as promising sources of these compounds [3]. This study aims to compare the antimicrobial activity of different parts of *Lantana camara* using disc diffusion and broth micro dilution methods. The goal is to evaluate its traditional use and identify potential sources of antibacterial agents. Lantana camara is an evergreen, aromatic shrub in the Verbenaceae. This plant has spread widely in many countries because it grows quickly and adapts easily. It has bright flower clusters and rough, fragrant leaves. Although, it is seen as an invasive species in some places, it is important in traditional and folk medicine. The bioactive compounds likely contribute to its wide range of medicinal effects. Extract of Lantana camara have demonstrate the ability to inhibit several harmful microorganisms, showing promise as a natural antimicrobial agent. Evaluating the plant's pharmacognosy is essential for proper identification, standardization, and quality control of natural drugs. Thus,

this study aims to conduct a pharmacognostical, phytochemical, and antimicrobial evaluation of Lantana camara leaves to determine their therapeutic potential and scientific importance. Lantana camara is a medicinal plant found in many areas. It is recognized for its rich phytochemical content and various biological activities. It has attracted scientific interest because of its antimicrobial and antifungal properties. The rise in resistant to synthetic drug and their environmental risks has pushed researchers to find plant-based, eco-friendly alternatives. As a result, Lantana camara leaf extract are considered potential natural agents for combating harmful microorganisms [4].

History:

Lantana camara was first scientifically described by Carl Linnaeus in 1753. It was introduced to India in 1809 as an ornamental plant and later spread quickly across forest and wasteland areas because of its invasive nature. Traditionally, people have used the plant in folk medicine to treat wounds, fever, asthma, ulcers, eczema, and various infections. Modern research on *Lantana camara* started in the mid-20th century. This research mainly focused on identifying and evaluating its harmful compounds, especially lantadenes, along with its potential medical uses [5].

Description of lantana camara (leaf):

Lantanacamara is a woody shrub that grows upright or spreads irregularly and can reach a height of 2-4 meters.

Leafcharacteristics:

Arrangement: Opposite

Type: Simple

Shape: Ovate to elliptical

Margin: Serrated

Surface: Rough and hairy

Venation: Reticulate

Colour: Dark green

Odour: Strong aromatic smell when crushed

Length: Approximately 5-9cm.

The leaves serve as the main site of synthesis and accumulation of secondary metabolites, which contribute to medicinal activity.

Morphology:

Lantana camara is a strong, impotency or inadequate shrub that grows between 1.2 to 2.4 meters or more even. It has study, recurved spines with a pungent smell of black current. The root system is very strong.

2. MATERIALS AND METHODS

2.1. Test for Alkaloids:

Add 1-2 drop of wagner's reagent to 1ml of extract to presence of reddish brown precipitate to confirm Alkaloids.

2.2. Test for Flavonoids:

Add 1 drop of 2% ferric chloride with diluted extract in a test tube to presence the colour varies between green, yellow, brown and violet to confirm flavonoids [6].

2.3. Test of Tannins:

Add 2 drop of 10% lead acetate was added with extract to presence of formation of a dense reddish brown precipitate was formed to confirm tannins [7].

2.4. Test for Saponins:

Add 2ml of ethanolic extract and add 5ml distilled water with shaken vigorously to presence of the persistant and abundant foam was formed to confirm saponins.

2.5. Test for Glycosides:

Boil the extract with dilute sulphuric acid cool and filter and add chloroform and shaken separate the chloroform layer and add dilute ammonia (Borntrager's test) to presence of pink to red colour in ammonical layer to confirm glycoside.

2.6. Test for Terpenoids:

Add 5ml of extract with 2ml of chloroform and add concentrated sulphuric acid along the side of the test tube to form a layer (Salkowski test) to presence of reddish brown was formed to confirm terpenoids [8].

3. RESULTS AND DISCUSSION

3.1. Determination of Total Flavonoids:

1ml of the extract and standard solution of quercetin was added to a 10ml containing 4ml of distilled water. After 5 minutes and 0.3ml of 5% sodium nitrite was added, followed by 0.3ml of 10% aluminium chloride. Then 2ml of 1M sodium hydroxide was added, and the final volume was adjusted to 10ml with distilled water. The solution's absorbance was measured at 510nm, and the results were expressed as mg quercetin equivalent per gram of dry weight plant material [9].

3.2. Determination of Total Phenol:

1ml of extract and standard solution was added to a beaker along with 9ml of distilled water. A reagent blank was prepared with distilled water. 1ml of Folin-Ciocalteu phenol reagent was added to the mixture and shaken. After 5 minutes, 10ml of 7% sodium carbonate solution was added. It was incubated for 90 minutes at room temperature. The absorbance was measured at 550nm with a UV/Vis spectrophotometer. The results are expressed as mg of tannic acid equivalent per gram of dry weight plant material [10].

Table 1: Phytochemical constituents from leaf extract

S.NO	Phytochemical constituents	Ethanolic Leaf Extract
1	Alkaloids	+ + +
2	Flavonoids	+ + +
3	Tannins	+ + +
4	Saponins	+ + +
5	Glycoside	+ + +
6	Terpenoids	+ + +

3.3. Antibacterial Activity:

The ethanolic leaf extract of *Lantana camara* was tested using the Kirby-bauer disk diffusion method against *E.coli*

and *S. aureus*. Bacterial suspension was spread on muller-Hinton agar. Discs containing 100-500mg/ml extract were applied. Ethanol served as the negative control, while gentamicin and nalidixic acid acted as positive controls. The plates were incubated at 37ºC for 24 hours, and the zones of inhibition were measured [11].

3.4. Antimicrobial Activity:

The plant extract (30mg/ml) were made in acetone or methanol and sterilized by filtering through 0.45µm filters. We tested antibacterial, anti-yeast and antifungal activities using disk diffusion and poisoned food methods. We measured microbial inhibition after incubation, using solvents as negative controls and gentamycin as the positive controls.

3.5. Antifungal Activity:

We evaluated the antifungal activity of *Lantana camara* leaf extract using the mycelial growth inhibition method. They incorporated the extract (50mg/ml) into PDA and placed 6mm fungal discs at the center of the plates. And incubated the plates at 28 ± 2ºC for 72hours, using PDA without extract as a control then measured growth and calculated the percentage inhibition [12].

4. CONCLUSION

It observed that, the selected plant extract possessed alkaloid, flavonoid, tannins, saponins, Glycoside and terpenoids. It also observed a promising antibacterial, antifungal and antimicrobial property.

5. REFERENCES

1. O'Neill J. Anti-microbial resistance- Tackling a crisis for the health and wealth of nations. Rev Antimicro resist 2014.
2. Bezerra JW, Rodrigues FC, costa AR, Rocha MI, Barros LM. Potencial medicinal De lantana camara L (Verbenaceace): uma Revisao. Cadernos de culture a ciencia 2016.
3. Nene Y and Thapiyal L. (2000) poisoned food technique of fungicides in plant disease control (3rd eds) Oxford and IBH publishing company, New delhi.
4. Okigbo RN and Nameka IA. Control of yam tuber with leaf extracts of oxylopia aethoiopica and zingiber officinale, Afr. J, Biotechnol 2005.
5. Abu-shanab B, adwan G, Jarrar N, Abu-hileh A, Adwan k. Anti-bacterial activity of four plant extracts used in Palestine in folkloric medicine against Methicillin-resistant staphylococcus aureus. Turk k. Biol 2006.
6. Agarwal GP, Hasija sk. In Agarwal GP, hasjia sk, editors. Microorganism in the laboratory guide of microbiology, mycology and plant pathology: CBS Publishers lucknow (u.p); 1986.
7. Ates DA, Erdogrul OT, antimicrobial activities of various medicinal and commercial plant extracts. Turk. J Biol 2003.
8. Kumin C.M. Resistance to antimicrobial drugs- A Worldwide calamity. Annals of internal medicine-1993.
9. Herandez T., Canalesa M., avilaa J,G, Durana A and caballerob J., de vivarc A. Romo and lira R. ethnobotany and antibacterial activity of some plants used in traditional medicine of zapotitlan de las Salinas, pueb-la. Journal pf ethnopharmacology-2003.
10. Hernacutendez T., Canales M., Garcia A.M., Duaacuten A., Geraz S. and davilla P. Antifungal activity of the essential lantana achyranthifolia and lippie graveolens of zapotitlan de las Salinas, publa, journal guilhermo avilla boletin latinoamericano y del Caribe de plantas medicinales y aromaticas-2008.
11. Ghisalberti EL, Camara LL. Lantana camara L (Verbenaceae) fitoterapia-2000.
12. Zoubiri s, baaliouamer A. GC and GC/MS analyses of the Algerian lantana camara leaf essential oil: effect against sitophillus granaries adults. J Saudi chem Soc-2011.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: The authors declare no conflict of interest, financial or otherwise.

SOURCE OF FUNDING: None.

AVAILABILITY OF DATA AND MATERIALS: Not applicable.

CONSENT FOR PUBLICATION: Not applicable.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE: Not applicable