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ORIGINAL ARTICLE **OPEN ACCESS**

Antimicrobial activity of *Lantana camara* on hospital-acquired infectious pathogens

A. D. Kadam[1], A. R. Sarkale[2], S.P. Bangar[2], B. S. Pawar[2], A. S. Jadhav[2], V. M. Ghorpade[2], A. A. Survase[2,3], P. B. Zambare[2,3], S. S. Kadam[4], B. M. Babar[5], S. B. Shaikh[6], and G. D. Kokate[2*]

[1]Department of Chemistry, Yashavantrao Chavan Institute of Science, Satara, 415 001, INDIA*
[2]Department of Microbiology, Yashavantrao Chavan Institute of Science, Satara, 415 001, INDIA
[3]Rayat Institute of Research and Development, Satara 415 001, INDIA
[4]Satara College of Pharmacy, Satara, 415 004, INDIA
[5]Department of Physics, Yashavantrao Chavan Institute of Science, Satara, 415 001, INDIA
[6]Department of Medical physics, Center for interdisciplinary Research, D. Y. Patil Education Society (Institution Deemed to be University) Kolhapur 416006
Corresponding Author
koksgd@gmail.com (Dr. G. D. Kokate)

ABSTRACT

We reported the antibacterial activities ofLantana camara(L. Camara) leaves extract to prevent hospital acquired pathogenic infections. Lantana camara is traditional plants used in pharmaceutical and medical field applications because of its low toxicity and economic viability. Thefunctional groups present in plants leaves play significant role in prevention of nosocomial infections. Antibacterial activities tested against Gram-negative pathogenic strains E. coli, P. Vulgaris, P. aeruginosaand Gram-positivebacteriaB. cereus and S. aureusby agar well diffusion method.In present studies we tested plant extract exhibited efficient bactericidal activity to inhibit pathogenic infections.

Keywords *– Lantana camara, Leaf extract, Antimicrobial activity, Kirby-Bauer disc diffusion method*

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INTRODUCTION

One of the most important risks to the effective treatment of microbiological diseases is the spread of bacteria that are drug resistant [1].

The majority of the world's population relies on traditional medicine for primary healthcare, according to the World Health Organization (WHO). [2]. It has been demonstrated that the essential oils of medicinal and aromatic plants contain antibacterial, antifungal, antiviral, insecticidal, and antioxidant properties. Plants are a significant source of organic natural products [3].

Tropical America originated, *L. Camara* plant is a short, erect, hairy, evergreen shrub in the *Verbenaceae* family. The most common species of this genus is *L. Camara* also referred to as red sage, backstage, white sage, and wild sage are just a few of the many common names for this major weed, which is found in over 60 different nations and island groupings and has over 650 different types. *L. Camara* is used for a variety of things, mostly as a herbal remedy and, in some places, as firewood and mulch. Along with it also be used for treatment of atoxy, high blood pressure, ulcer , high fever, carcinoma, rheumatism, plasmodium spread infection malaria and abdominal viscera are other conditions for which it is utilized In recent days, *L. Camara* is frequently encountered everywhere. It is both a well-known weed and a well-liked attractive garden plant [1]. The current research has therefore concentrated on isolating and partially purifying bioactive molecules from *L. Camara* and investigating In vitro antibacterial activity.

MATERIALS AND METHOD

Chemicals and media

Analytical grade reagents used for experimentation. Chemicals used without any further purification. Ethanol, purchased from Sigma Aldrich, USA. Nutrient broth and agar-agar, was purchased from Hi-Media Laboratories Pvt. Ltd., India.

Plant materials and extraction procedure

The fresh leaf of *L. Camara* was gathered from the herbal garden of Yashavantrao Chavan Institute of Science, Satara, Maharashtra, India in winter season. Plant matter was collected, dried in the shade, and powdered in a grinder with a mesh opening of 2 mm. The dried and powdered plant material (500 g) was progressively extracted for 48 hours at a temperature below the boiling point of the solvent with 1L each of acetone, methanol, and methanol using a soxhlet extractor. Filtration of the aqueous extracts was done using Whatman filter paper (No. 1). The collected residues were kept in a freezer at -4 ^{0}C until additional examination.

Antimicrobial assay

Kirby-Bauer disc diffusion method was used for antimicrobial activity. Saline water used to prepare microbial inoculum. Bacterial culture was grown in Nutrient agar (N.A.). The *S. aureus, B. cerus, E. coli, P. aeruginosa* and *P. vulgaris* cultures were spread on sterile Nutrient agar plates; 7 mm wells are prepared in Nutrient plates using sterile corkborer. 100 µg/ml plant extract were inoculate in the well with the help of micropipette. The plates were incubated at 37 ^{0}C for 24 h to test antibacterial activity. When the zone of inhibition surrounding each disc was visible, after 24 h, then the test findings were considered positive. Then, using a meter ruler to measure the zone of inhibition's diameter, the mean value of inhibition around each disc was determined and expressed in millimeter.

RESULTS

The present research was done to assess the antimicrobial activity *of L. Camara* leaf extracts against broad-spectrum hospital infections acquired by highly pathogenic Gram positive and negative class microorganism. Comparative testing of the antibacterial efficacy of leaf extracts revealed strong antimicrobial activity. The selected microbial communities' significant zone of inhibition was noted and is depicted in Table. The various resistance patterns seen in bacteria are probably due to variations in the organization of their cells, the structure of their cell walls, and how they synthesize proteins. Fig. 1 (a) shows the Zone of inhibition against *P. aeruginosa*, P*. vulgaris, E. coli, B. cereus*, and *S. aureus*. The antibacterial activity of the *L. Camara* leaves were tested, and the findings were examined and depicted in fig. 1. (b)

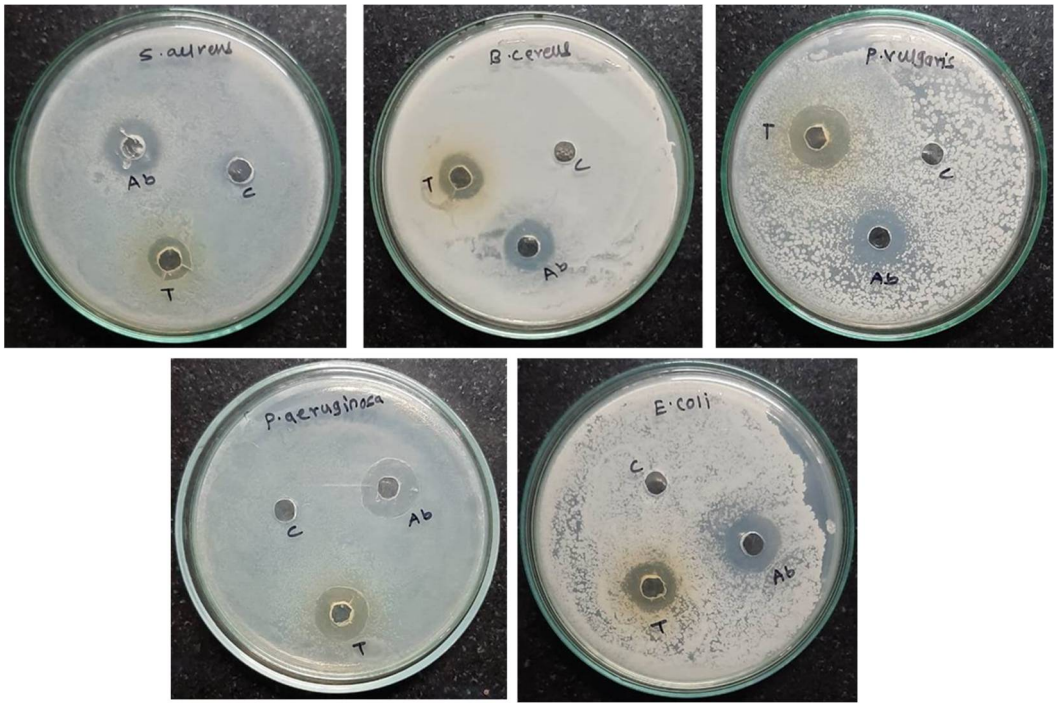

Fig. 1(a): Antimicrobial activity on the *Staphylococcus aureus,Bacillus cereus, Proteus vulgaris, Escherichia coliand Pseudomonas aeruginosa* zone of inhibition for T- *L. Camara* leaves extract, Ab-Antibiotic and C-Control

Fig. 1(b): The statistical analysis of *L. Camara* and standard antibiotic against bacterial human pathogens

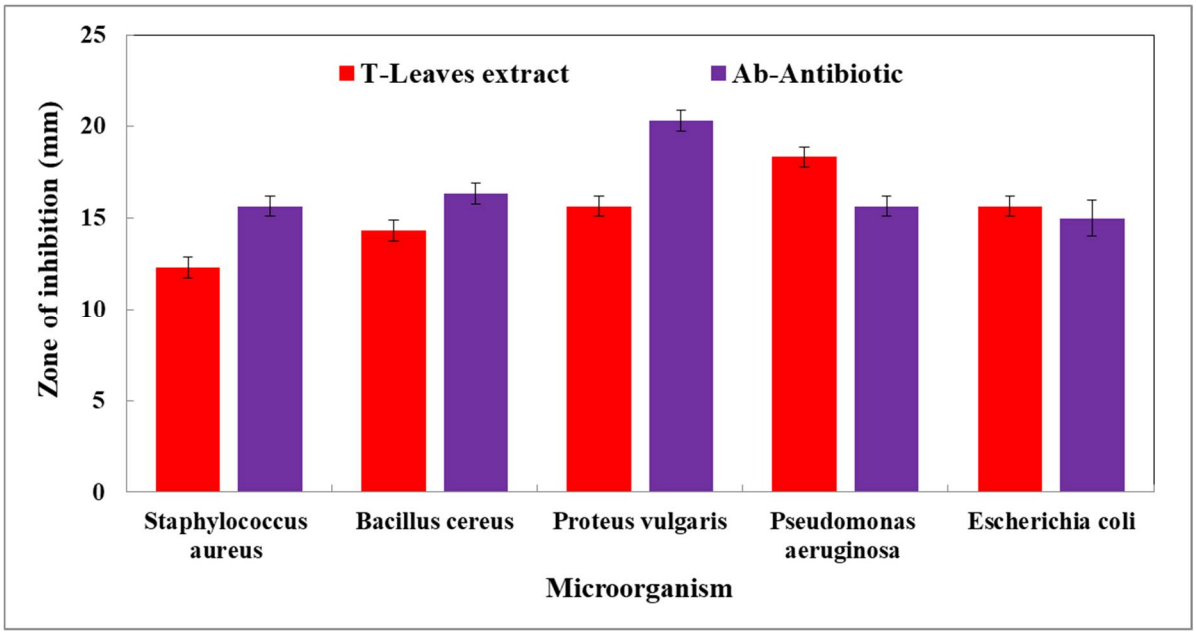

Table 1: Antibacterial activities of *L. Camara* leave extract on pathogenic bacterial strains

Lantana camara Planr extract	Antibacterial activity				
	Gram + Ve Bacteria		Gram - Ve Bacteria		
	Staphylococcus aureus	*Bacillus cereus*	*Proteus vulgaris*	*Pseudomonas aeruginosa*	*Escherichia coli*
T-Leaves extract	12.33 ± 0.57	14.33 ± 0.57	15.66 ± 0.57	18.33 ± 0.57	15.66 ± 0.57
Ab-Antibiotic	15.66 ± 0.57	16.33 ± 0.57	20.33 ± 0.57	15.66 ± 0.57	26.00 ± 1.00

DISCUSSION

The findings of the present investigation corroborated to the previous report of Kasali, Eukandayo and ouedeji they found the antimicrobial activity of *L. Camara* [5]. Hasan A. reported Guava (*Psidium guajava*), Sage (*Salvia officinalis*) leaf extracted samples against various class microorganism, such as *S. aureus, E. coli, P. multocida, B. cereus, S. Enteritidis* using agar disk diffusion method [6]. The antimicrobial activity of leaves extract may be due to the presence of triterpene like secondary metabolite in the extract and show antimicrobial activity of different plant pathogens these were studied by different workers [7]. Variation in antimicrobial activity due to change in chemical composition and bioactive component in each and every plant extract. [8]. Researchers also reported *Salvia officinalis L.,* a member of the *Lamiaceae* family, is a fragrant plant used in traditional medicine to treat a variety of conditions, including throat and mouth inflammation [9]. Soxhlet methodology extracted solvent show excellent antimicrobial activity against livestock disease. The leaves of the olive tree (*Olea europaea L.*) are used in many pharmaceutical studies because of their secondary metabolites, such as secoiridoid chemicals, which have hypotensive and hypoglycemic effects [10]. Recent research has demonstrated that the presence of numerous chemical groups in *L. Camara* leaves, such as phenolic, proanthrocyanidins, and anthocyanins, actively participated in the prevention of pathogenic infections.

CONCLUSION

Plant leaves are a typical garden waste. If used or disposed of improperly, it may contribute to the pollution issue. During the experiment, the antibacterial effects of L. Camara leaf extracts were observed to be most effective to prevent infections P. aeruginosa (18.33 ± 0.57), followed by P. vulgaris (15.66 ± 0.57), E. coli (15.66 ± 0.57), B. cereus (14.33 ± 0.57), and S. aureus (12.33 ± 0.57). The research has made it possible to use these L. Camara leaves in the creation of new drugs for the treatment of various pathogenic and drug-resistant microorganisms in the future. As a result, these are the greatest natural and affordable sources of antimicrobial compounds and can be utilized to treat a variety of diseases caused by microorganisms. Therefore, this research will undoubtedly expand the potential for using plant leaves as an antibacterial treatment.

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CONFLICT OF INTEREST
The authors claim no conflict of interest because none financial support received from any government, non-government agency to conduct this research work.

REFERENCES
1. Abu-Shanab B, Adwan G, Jarrar N, Abu-Hijleh A, Adwan K. (2006). Antibacterial activity of four plant extracts used in Palestine in Folkloric medicine against Methicillin-resistant Staphylococcus Aureus. Turk. J. Biol: 30: 195-204
2. Agarwal G P, Hasija S K. In Agarwal G P, Hasija S K, editors. (1986). Microorganisms in the laboratory guide of Microbiology, Mycology and Plant Pathology: CBS publishers Lucknow (U.P); 1- 48.
3. Tepe B, Daferera D, Sokmen M, Polissiou M, Sokmen A. (2004). In vitro antimicrobial and Antioxidant activities of the essential oils and various extracts of Thymus eigii . J AgricFoodChem 52; 1132-1137
4. Kasali A A, Ekundayo O, Oyedeji A O. (2002). Antimicrobial activity of the essential oil of Lantana camara (L.) leaves. Journal of Essential Oil Bearing Plants 5; 108-110
5. Hemeg H A, Moussa I M, Ibrahim S, Dawoud T M, Alhaji J H, Mubarak A S, Kabli S A, Alsubki R A, Tawfik A M, Marouf S A. (2020). Antimicrobial effect of different herbal plant extracts against different microbial population. Saudi Journal of Biological Sciences.1;27(12):3221-3227
6. Ates D A, Erdogrul O T. (2003). Antimicrobial activities of various Medicinal and commercial plant extracts. Turk. J. Biol; 27:157-162
7. Cowan, M.M., (1999). Plant products as antimicrobial agents.Clin.Microbial. Rev. 12 (4), 564–582
8. Baricevic D, Sosa S, Della Loggia R, Tubaro A, Simonovska B, Krasna A, Zupancic A. (2001). Topical anti-inflammatory activity of Salvia officinalis L. leaves: the relevance of ursolic acid. J Ethnopharmacol;75(2-3):125-132
9. Hansen, K., Adsersen, A., Christensen, B.S., Brooegger, S., Rosendal, J.S., Nyman, U., Wagner Smitt, U. (1996). Isolation of an angiotensin converting enzyme (ACE) inhibitor from oleaeuropaea and olealancea.Phytomed 2, 319–324

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