



ANTIBACTERIAL ACTIVITY OF VOLATILE OIL FROM AREAL PLANT *Galinsoga formosa*

Sharad Visht*, Vaibhav Rathi., Aanchal Saini and Nishat Anjum

Smt. Tarawati Institute of Bio-Medical & Allied Sciences, Saliyar Police Check Post, Roorkee-Dehradun Highway, Roorkee, Uttarakhand, 247667, India

ARTICLE INFO

Article History:

Received 11th January, 2018

Received in revised form 24th

February, 2018 Accepted 9th March, 2018

Published online 28th April, 2018

Key words:

Anti-bacterial, oil, activity, antibiotic, assay, microbiology

ABSTRACT

Purpose: The volatile oil shows various biological activities like antibacterial, antifungal, anti-inflammatory, antioxidant, anticancer activity etc. The antibacterial activity of their components may be a solution to increasing antibiotic resistance of microorganisms that is due to use of commercial antimicrobial drugs. The plant *Galinsoga formosa* (Family-Asteraceae) contain volatile oil and used in wounds, cuts, snake bite, diabetes, vomiting, high BP, antimicrobial, blood pressure, nutritive, astringent.

Material and method: The purpose of study was to determine the antibacterial activity of volatile oil obtained from distillation using Clevenger apparatus. The gram positive bacteria *Staphylococcus aureus* was used as test organism, nutrient broth as culture media and ampicillin as reference antibiotic. The oil showed 1.1±0.1 mm zone of inhibition while ampicillin showed 6.1±0.12 mm zone of inhibition.

Conclusion: It was concluded that oil show antibacterial activity.

Copyright©2018 Sharad Visht et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Since ancient times, the plants have been used as medicine. Their secondary metabolites/ bioactive compounds like glycosides, alkaloids, tannin, flavonoid, resins etc., have medicinal value due to several biological activities like antibacterial, antifungal, anti-inflammatory etc. Generally volatile oils show anti-microbial activity. During the last few decades, a great surge is in the study of various medicinal plants has increased rapidly due to their antibacterial and antioxidant activities, low toxicity and the potential to be a cheaper alternative to costly synthetic drugs. The antibacterial activity of these components may a solution to increasing antibiotic resistance of microorganisms that is due to use of commercial antimicrobial drugs.¹⁻⁵

Galinsoga formosa (Family-Asteraceae) is a branching annual herb up to 100 cm tall, leaves are up to 11 cm long and flower heads are up to 22 mm. Each head has 5-15 white (sometimes with a purplish underside) ray flowers surrounding up to 100 yellow disc flowers as shown in Fig. 1. The whole plant contain volatile oil. It contain triacontanol, phytol, beta-sitosterol, stigmasterol, 7-hydroxy-beta-sitosterol, 7-hydroxystigmasterol, beta-sitosterol-3-O-beta-D-glucoside, 3,4-dimethoxycinnamic acid, protocatechuic acid, fumaric acid, uracil and 48 volatile constituents in the hydrodistilled oil of the aerial parts.

It is used in wounds, cuts, snake bite, diabetes, vomiting, high BP, antimicrobial, blood pressure, nutritive, astringent.⁶⁻¹⁰

MATERIAL AND METHODS

The chemicals used were of analytical grade and procured from Renkem Pvt. Ltd.

Collection and authentication of plant

The plant *Galinsoga formosa* was procured from filed at STIBAS, Roorkee in the month of February and authenticated by Dr. Anjula Pandey, Principal Scientist, at the National Bureau of Plant Genetic Resources (NBPGR), New Delhi (Voucher No. NHCP/NBPGR/2017-30/4812).

Isolation of volatile oil

Accurately weighed 500 g of fresh plant of *Galinsoga formosa* was sliced and placed in round bottom flask. The Clevenger apparatus was placed and run the assembly for 5 h to isolate the oil.^{10,11}

Determination of antimicrobial activity

Test organism

The antibacterial activity was performed at Roorkee Research and Analytical Labs, Roorkee using *Staphylococcus aureus*.

Culture media

Nutrient agar media (Himedia Laboratories Ltd. India) was used as culture media. The sterilized media was transferred in laminar flow chamber under aseptic conditions.

*Corresponding author: Sharad Visht

Smt. Tarawati Institute of Bio-Medical & Allied Sciences, Saliyar Police Check Post, Roorkee-Dehradun Highway, Roorkee, Uttarakhand, 247667, India

Inoculum

Nutrient agar media (Himedia Laboratories Ltd. India) was used to inoculate bacteria and incubated at 37±2°C for 4 h.

Antibacterial assay

The anti-bacterial activity was measured by the standard disc diffusion method (IP-1996). The carpet culture technique was used to spread the bacteria on agar plates. Filter paper discs (6 mm diameter) were cut using a punch machine, sterilized in a dry heat sterilizer and kept in the refrigerator for further use. The disc previously dipped in volatile oil of *Galinsoga formosa* plant was placed on surface of culture medium in Laminar air flow cabinet. The agar plates were incubated for 24 h at 37 °C in incubator. The zones of inhibition were determined by Fisher-Lilly zone reader after 24 h. The 10 µg/ml concentration of ampicillin was used as reference antibiotic.¹²⁻²²

Statistical Analysis

All the experimental results were performed in triplicate and the results were expressed as mean ± Standard Deviation (SD).²³

RESULTS AND DISCUSSION

The zone of inhibition of *Galinsoga formosa* oil was found to be 1.1±0.1 mm and ampicillin was 6.1±0.12 mm that indicate the oil bears poor antibacterial activity than ampicillin (10 µg/ml) as shown in Fig. 2.

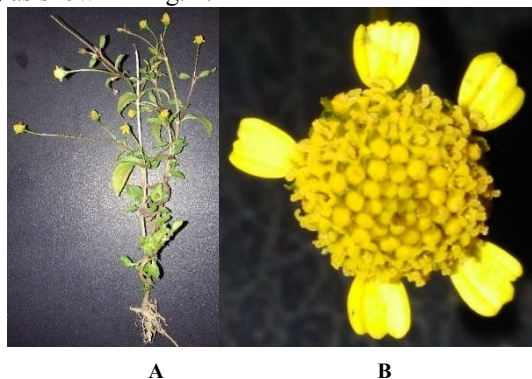


Fig1. *Galinsoga formosa* Plant (A) and Flower (B)



A



B

Fig 2 Antibacterial activity of Ampicillin (A), *Galinsoga Formosa* oil (B)

CONCLUSION

The oil of *Galinsoga formosa* showed antimicrobial activity but it was very low as compared to standard antibiotic ampicillin.

Conflict of Interest Statement

We declare that we have no conflict of interest.

Acknowledgement

I am thankful to Director, STIBAS to provide every possible facility to conduct this research successful.

References

1. Mostafa I, Abd El-Aziz E, Hafez S, El-Shazly A.: Chemical constituents and biological activities of *Galinsoga formosa* flora cav. Asteraceae) from Egypt. NCBI. , 2013; 68(7-8):285-92.
2. <https://herbpathy.com/Uses-and-Benefits-of-Galinsoga-Parviflora-Cid5725>
3. Shihabudeen MH, Priscilla DH, Thirumurugan K. Antimicrobial activity and phytochemical analysis of selected Indian folk medicinal plants. *Int J PharmaSci Res*, 2010; 1: 430-434.
4. Richard FT, Joshua AT, Phillips AJ.: Effect of aqueous extract of leaf and bark of guava (*Psidium guajava*) on fungi *Microsporiumgypseum* and *Trichophyton mentagrophytes*, and bacteria *Staphylococcus aureus* and *Staphylococcus epidermidis*. *AdvMedPlantRes*, 2013; 1(2): 45-48.
5. Mukhtar H, Ahmed N. Tea polyphenols: prevention of cancer and optimizing health. *Am J ClinNutr*,2000; 71: 1698S-1702S.
6. Sarmiento WC, Maramba CC, Gonzales MLM. : An in-vitro study on the antibacterial effect of neem (*Azadirachta indica*) leaf extract on methicillin-sensitive and methicillin-resistant *Staphylococcus aureus*. *PIDSP J*, 2011; 12(1): 40-45.
7. Chew AL, Jessica JJ, Sasidharan S.: Antioxidant and antibacterial activity of different parts of *Leucasaspera*. *Asian Pac J Trop Biomed*, 2012; 2: 176-180.
8. Archana S, Abraham J.: Comparative analysis of antimicrobial activity of leaf extracts from fresh green tea, commercial green tea and black tea on pathogens. *J Appl Pharm Sci*,2011; 1(8): 149- 152.

9. Clinical and Laboratory Standard Institute. Performance standards for antimicrobial susceptibility testing; twenty-first informational supplement, M100S21. New York: Clinical and Laboratory Standard Institute; 2011. [Online] Available from: <http://www.techstreet.com/products/1760826> [Accessed on 10th July, 2014]
10. Kumar A, Kumar A, Thakur P, Patil S, Payal C, Kumar A, *et al.*: Antibacterial activity of green tea (*Camellia sinensis*) extracts against various bacteria isolated from environmental sources. *Recent Res SciTechnol*, 2012; 4(1): 19-23.
11. Lekshmi NCJ, Sowmia N, Viveka S, Brindha JR, JeevaS.: The inhibiting effect of *Azadirachta indica* against dental pathogens. *Asian J Plant Sci Res*, 2012; 2(1): 6-10.
12. Efstratiou E, Hussain AI, Nigam PS, Moore JE, Ayub MA, Rao JR.: Antimicrobial activity of *Calendula officinalis* petal extracts against fungi, as well as Gram-negative and Gram-positive clinical pathogens. *Complementary TherClinPract*, 2012; 18: 173-176.
13. Abimbola KA, Obi CL, Alabi SA, Olukoya DK and Ndip RN. : Current Status on biotyping antibiogram and plasmid profiles of *E. coli* isolates. *East Afr. Med. J.*, 1993;70:207-210.
14. Ali BH, Blunden G, Tanira MO and NemmarA.: Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale* Roscoe): A review of recent research. *Food Chem. Toxicol.*, 46(2): 409-420.
15. Apata L. (1979). Practice of Herbalism in Nigeria. University of Ife Press.
16. Chen IN, Chang CC, Ng CC, Wang CY, Shyu YT and Chang TL.:Antioxidant and Antimicrobial Activity of Zingiberaceous Plants in Taiwan. *Plants Foods Hum. Nutr.*, 2008;63: 15-20.
17. ICMR Bulletin. Ginger: It's Role in Xenobiotic Metabolism. Accessed on 29/08/2010 (<http://icmr.nic.in/BUJUNEO3nwe.pdf>)
18. Khulbe K and Sati SC.:Antibacterial Activity of *Boenninghauseniaalbiflora*Reichb. (Rutaceae). *Afr. J. Biotechnol.*, 2009;8(22):6346-6348
19. Onyeagba RA, Ugbogu OC, Okeke CU and Iroakasi O.: Studies on the antimicrobial effects of garlic (*Allium sativum* Linn), ginger (*Zingiber officinale* Roscoe) and lime (*Citrus aurantifolia* Linn). *African Journal of Biotechnology*, 2004;3 (10):552-554.
20. PankajSah, Al-Tamimi B, Al-Nassri N and Al-Mamari R.: Effect of temperature on antibiotic properties of garlic (*Allium sativum* L.) and ginger (*Zingiber officinale* Rosc.). *African Journal of Biotechnology*, 2012; 11(95):16192-16195.
21. Sharma S, Vijayvergia R and Singh T.: Evaluation of antimicrobial efficacy of some medicinal plants. *J. Chem. Pharm. Res.*, 2010; 2(1): 121-124.
22. Sofowora A. (1984): Medicine plants and traditional medicine in Africa. John Wiley and Chichester.
23. Tan BKH and Vanitha J.: Immunomodulatory and Antibacterial Effects of Some Traditional Chinese Medicinal Herbs: A Review. *Curr. Med. Chem.*, 2004; 11(11):1423-1430.

How to cite this article:

Sharad Visht *et al* (2018) 'Antibacterial Activity of Volatile Oil From Areal Plant *Galinsoga formosa*', *International Journal of Current Advanced Research*, 07(4), pp. 11446-11448. DOI: <http://dx.doi.org/10.24327/ijcar.2018.11448.1981>
