

ANTIBACTERIAL ACTIVITY OF METHANOLIC EXTRACTS OF *ZEPHYRANTHES CANDIDA*MANOJ KUMAR SINDIRI¹, MANASA MACHAVARAPU², MEENA VANGALAPATI^{3*}^{1,2}M.Tech student, Department of chemical engineering, Center for biotechnology, AUCE (A), Andhra university, Visakhapatnam,³Associate Professor, Department of chemical engineering, center for biotechnology, AUCE(A), Andhra university, Visakhapatnam, Email: meena_sekhar09@yahoo.co.in

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ABSTRACT

Objective: To evaluate the anti-bacterial activity.

Methods: *Zephyranthes candida* is a perennial herb, used as folk medicine in many countries. In the present study antibacterial activity of methanolic extract of *Z. candida* leaves was evaluated against *Bacillus subtilis*, *Klebsiella pneumonia*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Enterobacter aerogenes* bacterial strains by Agar well diffusion method. Methanol was used as control for this study.

Results: The inhibition zones for bacterial strains were found to be 0 mm, 3 mm, 8.5 mm, 6 mm, 8 mm and 7 mm respectively.

Conclusion: From the outcomes of this study *Z. candida* shows antibacterial activity.

Keywords: *Zephyranthes candida*, methanolic extract, *Bacillus subtilis*, *Klebsiella pneumonia*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Enterobacter aerogenes*

INTRODUCTION

Ayurveda and siddha medicines were alternative systems for medicine which were become popular in recent days. Now a days scientists of different fields were focusing on plants for their antimicrobial usefulness as an alternative source to chemically formulated drugs. Plants with their wide variety of chemical constituents offer a promising source of new antimicrobial agent as well as for other biological activities [1, 2].

The genus *Zephyranthes* in the Amaryllidaceae contains several species of flowering bulbs used in landscape and potted flower production [3]. *Zephyranthes* spp. grow from truncated bulbs, with their active period of growth and flowering in the summer and a rest period in the winter [4].

Zephyranthes candida is a perennial herb mainly distributed in China and some other Asian countries. Species of this genus are widely distributed in warm-temperate regions of western hemisphere [5]. *Z. candida* is mostly used as ornamental and medicinal plant in china and also plants of this genus were used as folk medicine in many countries because of their pharmacological activities. The decoction of leaves of *Z. candida* has been used in South Africa as a remedy for diabetes mellitus [6]. It has biological activities like antimicrobial, antiviral, antitumor etc, because of its alkaloid contents and many other chemical compounds like flavonoids, phenolic [7, 8].

The present research work carried out to evaluate the anti-bacterial activity of *Zephyranthes candida* leaves.

MATERIALS AND METHODS

Collection of plants

Zephyranthes candida plants were used in the present study, to evaluate anti-bacterial activity. Plants were procured from local nursery, Visakhapatnam, Andhra Pradesh.

Preparation of extract

Extract was prepared from 80 % (v/v) methanolic extract of plant leaf powder from the soxhlet extractor. The final extract from soxhlet extractor was purified by column chromatography using silica gel as a column. This purified extractor was used further for anti-bacterial activity.

Microorganisms

Bacillus subtilis, *Klebsiella pneumonia*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Enterobacter aerogenes* are the bacterial strains were used in this study.

Maintenance of microorganisms

The pure bacterial cultures were maintained nutrient agar slants for 2 - 3 days at 28°C. These cultures were further maintained by sub-culturing on the same medium and then stored at 4°C before use. 10 ml sterile of sterile water added to the slants, then the bacterial growth on the slants grated with sterile loop and then homogenized. This homogenized solution used as inoculum for bacterial growth.

Determination of antibacterial activity

Antibacterial activity of plant extract was approximated by agar well diffusion method of Murray, 1995 modified by Olurinola, 1996 [9, 10].

15ml of nutrient agar was dispensed in sterile conical flasks, these were then inoculated with 0.5 ml of bacterial culture suspension, mixed softly and poured into sterile petri dishes. After serializing borer, used to make wells at the center of petri dish. A drop of liquefied nutrient agar was used to seal the base of each well. The wells were filled with 0.5 ml of plant extract of concentration 190 µg/ml and then place in refrigerator for 45 min to allow uniform diffusion. The solvent used for extract preparation were similarly analyzed as control. The plates were incubated at 30°C for 48 hours. The zones of inhibition were compared with control zone scale in mm and the experiment was carried out in duplicates.

RESULTS AND DISCUSSIONS

Antibacterial activity for methanolic extract of leaves of *Z. candida* were evaluated by agar well diffusion method by measuring the diameter of the growth inhibition zone. The results were tabulated in Table 1, Figure 1.

Antibacterial activity of *Z. candida* was evaluated against *Bacillus subtilis*, *Klebsiella pneumonia*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Enterobacter aerogenes*

bacterial strains and the inhibition zones were found to be: 0 mm, 3 mm, 8.5 mm, 6 mm, 8 mm and 7 mm respectively, Figure 2.

In the present study methanolic extract of leaves of *Z. candida* shows the highest antibacterial activity against *E. coli* and *S. aureus*, while moderate degree of activity against *P. aeruginosa* and *E. aerogenes* and less effective against *K. pneumonia* and no antibacterial activity was found against *B. subtilis*.

Table 1: zone of inhibition against different bacterial strains

| Organism | Zone of inhibition (mm) |
|-------------------------------|-------------------------|
| <i>Bacillus subtilis</i> | 0 |
| <i>Klebsiella pneumonia</i> | 3 |
| <i>Escherichia coli</i> | 8.5 |
| <i>Pseudomonas aeruginosa</i> | 6 |
| <i>Staphylococcus aureus</i> | 8 |
| <i>Enterobacter aerogenes</i> | 7 |

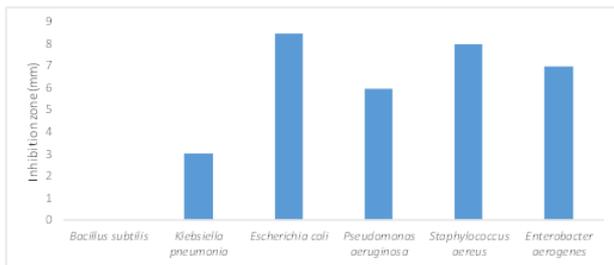


Fig. 1: Antibacterial activity graph on different bacterial strains

CONCLUSION

From the above results it can be concluded that leaves of *Z. candida* have great potential as antibacterial activity and can be used in the treatment of infectious diseases caused by resistant microorganisms. *Z. candida* showed maximal potential against *E. coli* and *S. aureus* among the tested organisms. The present study supports that, this plant can be used to discover bioactive natural products that may lead to development of new drugs for bacterial inhibition.

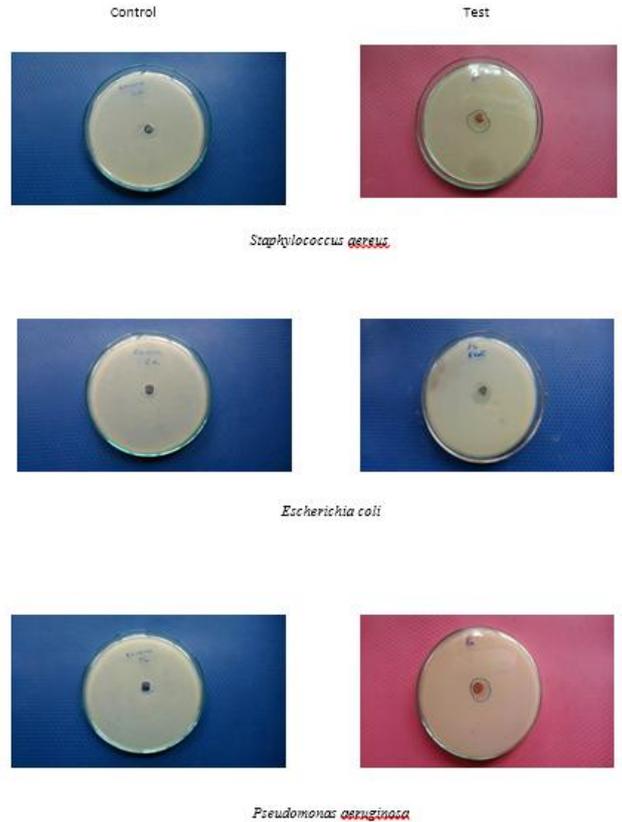
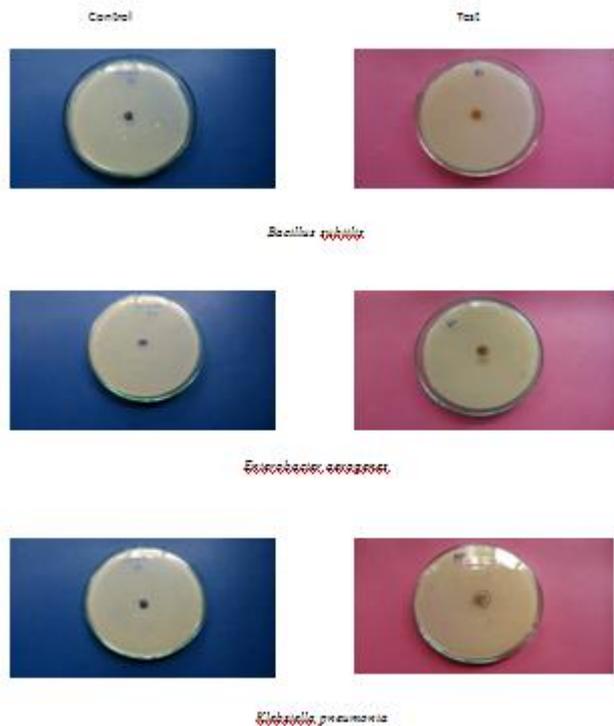


Fig. 2: Affect of methanolic extracts of leaves of *Z. candida* against different bacterial strains

REFERENCES

1. KamaliHhel, Amir Myel. Antibacterial Activity and Phytochemical Screening of Ethanolic Extracts Obtained from Selected Sudanese Medicinal Plants. Curr. Res. J. of Bio. Sci. 2010; 2(2): 143-146.
2. MadhuKumari. Evaluation of Methanolic Extracts of In Vitro Grown *Tinospora Cordifolia*(Willd) For Antibacterial Activities. Asian Journal of Pharmaceutical and Clinical Research 2012; 5(Suppl 3): 172-175.
3. Smith RH, Burrows J and Kurten K: Challenges associated with micropropagation of *Zephyranthes* and *Hippeastrum* sp. (Amaryllidaceae). In Vitro Cellular and Developmental Biology 1999; 35: 281-282.
4. De Hertogh AA, Le Nard M: The physiology of flower bulbs. Elsevier Science Publishers. Amsterdam: the Netherlands; 1993.
5. Thoibi DT, Borua PK: Meiotic behaviour and pollen fertility in three species of *Zephyranthes* (Amaryllidaceae). Biol Plant 1997; 39: 355-360.
6. Pettit GR, Gaddamidi V, Cragg GM: Antineoplastic agents, 105. *Zephyranthes grandiflora*. J Nat Prod 1984; 47: 1018-1020.
7. Zhi-Ping Wu, Yu Chen, Bing Xia, Ming Wang, Yun-Fa Dong, Xu Feng: Two Novel Ceramides with a Phytosphingolipid and a TertiaryAmide Structure from *Zephyranthes candida*. Lipids2009; 44: 63-70.
8. Shailesh R. Waghmare, Kailas D. Sonawane, Prasad B. Hosmat. Antibacterial Activity Of Vulgarol A Extracted From the Leaves of *SyzygiumCumini*. Asian journal of pharmaceutical and clinical research 2013; 6(4): 100-102.
9. Murray PR, Baron EJ, Pfaller MA, Tenover FC, Yolken HR: Manual of Clinical Microbiology. 6th Edition. Washington DC: ASM Press; 1995.p.15-18.
10. Olurinola, PF, A laboratory manual of pharmaceutical microbiology. Idu Abuja; Nigeria: 1996.p.69-105.