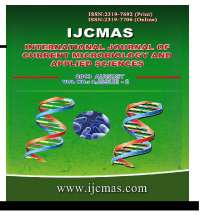
Int.J.Curr.Microbiol.App.Sci (2013) 2(8): 260-262

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 2 Number 8 (2013) pp. 260-262**
http://www.ijcmas.com



Original Research Article

A study on antibacterial activity of mangrove plant *Excoecaria agallocha* L.

M. Prakash and T. Sivakumar*

Department of Microbiology, Kanchi Shri Krishna College of arts and Science, Kilambi, Kancheepuram - 631 551, Tamilnadu, India
**Corresponding author e-mail: shiva_fungi@rediffmail.com*

Keywords

Mangrove plants; *E. agallocha;* solvent extraction; Antibacterial activity.

A B S T R A C T

The mangrove plant of *Excoecaria agallocha* L. were collected from the Muthupet mangrove forest and used for the extraction of fresh and dried parts of leaves stem and root respectively. These plant materials were used to derive the ethanolic extracts and antibacterial activity of solvent extract were performed by the disc diffusion method, agar well method and minimal inhibitory concentration methods. In the dried plant sample the leaf part of *Excoecaria agallocha* is having higher inhibitory activity against the pathogenic bacteria compared than the fresh plant extracts of *Excoecaria agallocha* L.

Introduction

Mangrove is a woody plant, which lives between the sea and the land in areas, which are inundated to survive in salty soils that would kill most other kinds of plants. Majority of the mangrove plants posses the medicinal and commercial importance, such as *Rhizophora, Bruguiera, Excoecaria, Xylocarpus, Avicennia, etc.* are extensively used as firewood by the coastal people of tropical and subtropical countries. Mangroves serve as a nursery, feeding and spawning grounds for commercial fishes and shellfishes, provide detritus for the coastal ecosystem, reduce cyclone and wind damage and prevent soil erosion (Lawton *et al.*, 1981). It is also serves as a nesting and feeding ground for a variety of wild life and as a coastal pollutants sink or trap. They have been exploited by coastal people for their numerous products like fodder, fuel, wood, pulp vegetable tannins, poles for building and medicine (UNEP, 1988). Numerous medicines are derived from mangrove. They are used for curing elephantiasis, abdominal troubles, and skin diseases. They also cure sores, Leprosy, head-aches, rheumatism, snakebites, and boils, ulcers, diarrhoea and haemorrhages (Selvaraj *et al.*, 1995). As a potential source of mosquito repellents, larvicides and for antiviral drug formulations especially against AIDS and jaundice. Majority of the seaweeds and sea grasses already used to study their medicinal and economical activities, have been done by various researches. But no more works done by the previous workers in the mangrove plants related to anti microbial activity. The aim of the present study is to

explore the potential of antibacterial substances occurring in the *Excoecaria agallocha* extracting with ethanol against five bacterial pathogens.

Materials and Methods

Mangrove plants and bacterial pathogens

The mangrove plants of *Excoecaria agallocha* were collected from the Muthupettai mangrove forest of Thiruvarur district of Tamilnadu, India. Totally, five different bacterial pathogens like*Vibrio cholerae, Salmonella typhi, Staphylococcus aureus, Proteus* sp. and *Enterobacter* sp. were used for the study.

Soxhelet extraction of fresh and dried samples

The extract was obtained from the powder by using the Soxhelet apparatus. Various concentrated ethanol extracts dried by air drying for 10 minutes.

Assay of antibacterial activity

Assay of antibacterial activity of the plant extract were done by disc diffusion technique, Agar well method and Minimal inhibitory concentration method.

Result and Discussion

The mangrove plant parts of *Excoecaria agallocha* were tested for their antibacterial activity against certain opportunistic pathogen like S*taphylococcus aureus, Salmonella typhi, Vibrio cholerae*, *Proteus* sp. *Enterobacter* sp. (both gram positive and gram negative) using solvent extract of E*xcoecaria agallocha.*

Fresh leaf samples of *E. agallocha* L.

The results of disc method showed that the higher antibacterial activity for *Enterobacter* species (25 mm), *Staphylococcus aureus (*24 mm) and minimum inhibitory was observed in *Proteus* sp. (8 mm) and *S .typhi* (9 mm). In agar well method, the extract showed higher activity for *Proteus* sp. with 22 mm and *Vibrio cholerae* and 20 mm and minimum activity was observed in *S. aureus* (5 mm) and *Proteus* sp. (6 mm). In Broth culture method, the ethanol extract of sample were showed higher activity in *Salmonella typhi* (0.311)

Fresh root samples of *E. agallocha* L.

Maximum antibacterial activity was observed in *S. typhi* (24 mm), *Enterobacter* sp. (23 mm). Ethanolic extract of *E. agallocha* showed higher activity for *S.typhi* with 21 mm and *Proteus* sp. *Enterobacter* sp. *Vibrio cholerae* with 20 mm in agar well method.

Fresh stem samples of *E. agallocha* L.

Excoecaria agallocha ethanol extract showed higher anti bacterial activity for *Enterobacter* sp. with 22 mm, *V. cholerae* (20 mm). In well method, the extract showed higher activity for P*roteus* sp. with 20 mm and *V. cholerae* with 18 mm In Broth culture method, the ethanol extract of sample were showed higher activity, *S .aureus* (0.296) and *Proteus* sp. (0.223).

Dried leaf samples of *E. agallocha* L.

Maximum anti bacterial activity was found to be *S. typhi* (26 mm), *V. cholerae* (24 mm) followed by *S. aureus* (23mm). Extract of *E. agallocha* was showed higher activity for *Enterobacter* sp. (25 mm) using agar well method. The ethanol extract of sample were showed higher activity, *S. aureus* (0.369) and *S. typhi* (0.298) in broth culture method.

Dried root samples of *E. agallocha* L.

Excoecaria agallocha ethanol extract showed higher anti bacterial activity for *S. aureus* (26 mm). In well method, the extract showed higher activity for *S.aureus* with 27 mm. In Broth culture method, the ethanol extract of sample were showed higher activity, *S. aureus* (0.385).

Dried stem samples of *E. agallocha* L.

Maximum higher antibacterial activity was noted in *Proteus* sp. with 26 mm, *E. aerogens* (22 mm). In well method, the extract showed higher activity for *V. cholerae* with 25 mm. The ethanol extract of sample were showed higher activity, *S. aureus* (0.385) followed by *S. typhi.* (0.276) and *Enterobacter* sp. (0.256).

Present work investigated on antibacterial activity of the extract of *Excoecaria agallocha* various organic solvents were used for the extraction of the bio-active compounds of the plants (Saha *et al.*, 1995). The leaves of *Vitex negundo* have been reported to used for the treatments of eye diseases, tooth hacks, rheumatoid arthritis, etc., (Das and Das, 1994). In our work the organic solvent ethanol was used to extract the bioactive compounds of various parts of the plant. Mangrove forests have played an important role in the Socio – economics life of the people. The mangrove forests have several valuable medicinal plants that are used in medicinal fields (Azariah *et. al.*, 1987; Thomas *et al.*, 1996; Das and Das, 1994). This study has revealed the antibacterial activity of mangrove plants and can be suggested that the bioactive contents of the mangrove plants are promising natural antimicrobial agents that can be harnessed as potential antibacterial and fungal toxicants. Further, extensive studies are recommended for these mangrove plants samples to actually identify the bioactive compounds responsible for their antimicrobial activities.

References

Azariah, J., R. Mohan, S.R. Sekahr, V. Selvam and Gunasekaran.S. 1987. Hydrobiocoenology of Mangrove Ecosystem, Muthupet Tamil Nadu. Project report submitted to Indian council of Agricultural Research, New Delhi.

Das, B., and Das, R. 1994. Medicinal properties and chemical constituents of *Vitex negundo* Linn. Indian drugs. 31: 152-170.

Lawton, J.R., A.Todd and Naidoo, D.K. 1981. Preliminary investigations into the structure of the roots of the Mangroves, *Avicennia marina* and *Bruguiera gymnorrhiza* in relation to ions uptake. New phytol. (88): 713 – 722.

Saha, K., P.K.Mukherjee, S.C. Mandal, M. Pal and Saha, B. P. 1995. Antibacterial activity of *Leucas lavandulaefolia* Ree (Labiatae). Indian Drugs. 32: 402 – 404.

Selvaraj, A.M., G. Santhana Kumar and Augustine Xavier, P. 1995. Biomass production through mangrove coastal social forestly Proceedings of National symposium on Mahatma Gandhi Institute of integrated Rural Energy. Planning and Department, Bakoli, New Delhi.

Thomas, E.S., J.A. Shanmugam and Rafi, M.M. 1996. Antibacterial activity of plants belonging to Zingiberaceae family. Biomedi. 16 (2,3): 15- 20.