

ANTIMICROBIAL ACTIVITY OF MANGROVE PLANT EXTRACTS ON *AEROMONAS HYDROPHILA*

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Abstract

Mangrove plant seeds, bark, leaves and roots have pharmacologic activities that function as antioxidant, antibacterial and antiviral compounds. They are rich source of bioactive compounds. Five species of mangrove plants such as *Acanthus ilicifolius*, *Avicennia officinalis*, *Clerodendrum inerme*, *Bruguiera cylindrica*, *Rhizophora apiculata* were collected from Chettuva mangrove ecosystem of Thrissur District, Kerala. The antibacterial activity of leaf extracts of these plants on *Aeromonas hydrophila* was analysed. The mangrove plant leaf extracts treatment showed inhibitory effect on the growth of *A. hydrophila* in the medium.

Keywords: Mangroves, *Acanthus ilicifolius*, *Avicennia officinalis*, *Clerodendrum inerme*, *Bruguiera cylindrica*, *Rhizophora apiculata* and *Aeromonas hydrophila*.

Introduction

Mangroves grow in saline coastal sediment habitats in the tropical and subtropical intertidal zones of the world. It is an exclusive group of plants with remarkable ecological importance, inhabits mostly the zones washed by the back and forth movement of tides (Packialashmi and Kanimozhi, 2014). Mangrove plant seeds, bark, leaves and roots have pharmacologic activities that function as antioxidant, antibacterial and antiviral compounds. They are rich source of bioactive compounds. Many secondary metabolites of medicinal value like alkaloids, phenolics, steroids and terpenoids have been characterized from mangrove plants which have pharmacological importance (Packialashmi and Kanimozhi, 2014). The bioactive compounds have high medicinal value, which reduce the virulence of the microorganisms, thereby preventing and protecting from the infections and have no side effects. These plants have been extensively used in traditional medicine and different studies have revealed their activity against human, animal and plant pathogens. *Aeromonas hydrophila* is a heterotrophic, gram negative, rod shaped bacterium mainly found in areas with a warm climate. It produces aerolysin cytotoxic enterotoxins that can cause tissue damage. *Aeromonas hydrophila* considered to be opportunistic pathogens, they rarely infect healthy individuals, also it is widely considered as a major fish and amphibian pathogen.

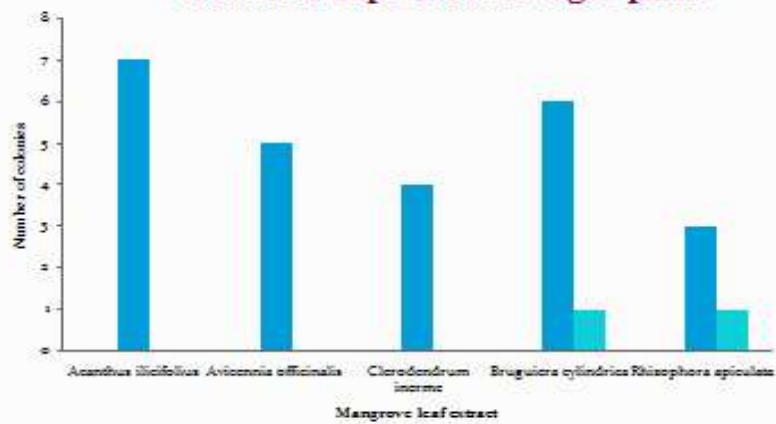
Methodology

Five species of mangrove plants such as *Acanthus ilicifolius*, *Avicennia officinalis*, *Clerodendrum inerme*, *Bruguiera cylindrica*, *Rhizophora apiculata* were collected from Chettuva mangrove ecosystem of Thrissur District, Kerala. The ethanol and aqueous extracts of leaves of these plants were prepared. Cultures of *Aeromonas hydrophila* were prepared in laboratory by collecting water sample from Karuvannur river of Thrissur. Mac Conkey agar medium were used for bacterial culture. Growth of *Aeromonas hydrophila* were estimated by counting the developed colonies in the culture plate.

Result and Discussion

A control agar plate that contain Mac Conkey agar medium and water sample incubated at 37°C for 24 hours. Bacterial growth were analysed by counting the colonies appeared on agar plate. Test marked as A,B,C,D and E containing Mac Conkey agar medium and water sample treated with mangrove leaf extracts of *Acanthus ilicifolius*, *Avicennia officinalis*, *Clerodendrum inerme*, *Bruguiera cylindrica*, *Rhizophora apiculata* respectively and colony formation were observed. No colony was developed in the culture medium, which treated with *Acanthus ilicifolius*, *Avicennia officinalis* and *Clerodendrum inerme*, whereas the culture plates treated with *Bruguiera cylindrica* and *Rhizophora apiculata* developed one colony each. All the plant extracts showed good growth inhibition. Most effective inhibitory activity produced by *Acanthus ilicifolius*, *Avicennia officinalis* and *Clerodendrum inerme*. Least inhibitory activity exhibited by *Bruguiera cylindrica* and *Rhizophora apiculata*. The results of the present investigation showed that the mangrove plant leaf extracts treatment result in drastic reduction in the growth of *Aeromonas hydrophila*. These findings were found to be in agreement with the antibiotic study of Suganya and Thangaraj (2014). Similar observations were also reported by Ravikumar *et al.*,(2010), Nagababu and Umamaheswara (2014), Shiva and Behrouz (2011) and Sreenivasa Rao *et al.*,(2015).

Bacterial growth of *Aeromonas hydrophila* on treated and pretreated agar plate



Conclusion

Mangrove leaves contain several bioactive secondary metabolites which give antibacterial, antioxidant, antifungal and anti-inflammatory activities. These valuable antimicrobial compounds which are ecologically safe and economically viable. Therefore, it is worth to screen mangrove plants for presence of important antimicrobial compounds to compete with the pathogenic microbes.

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