



ANTIBACTERIAL ACTIVITY OF MEDICINAL PLANTS AGAINST *AEROMONAS HYDROPHILA*

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ABSTRACT

An investigation was carried out to estimate the antibacterial activity of different concentrations of medicinal plants against common fish pathogen *Aeromonas hydrophila*. The ethanolic extracts of *A.catechu*, *C.papaya*, *E.camaldulensis*, *P.ambonius* and *O.basilicum* were prepared in different concentrations from 10%, 20%, 30%, 40% and 50% and antibacterial activity against *A. hydrophila* was performed by following well diffusion assay. Among the extracts *O.basilicum* showed maximum inhibition against *A. hydrophila* by producing 27mm inhibition followed by *E.camaldulensis* 23mm and *A.catechu* 21mm of inhibition at 50% concentration respectively against *A. hydrophila*. This study suggested that the higher concentrations of *O.basilicum*, *E.camaldulensis*, *A.catechu* can be a potential source for developing antibacterial agent against common fish pathogen found in the fresh water fishes and are responsible for disease like fin rot disease, dropsy, haemorrhagic septimelia and ulcerative diseases etc.

KEYWORDS: Antibacterial activity, medicinal plants, ethanolic concentrations, *Aeromonas hydrophila*, Well diffusion assay.

INTRODUCTION

Aquaculture has become a key component of the animal health industry due to the continued expansion of cultured fish and shell fish species. Aquaculture is the fastest growing industry around the world with about 50 million tonnes being produced annually (Kolkovski *et al.*, 2011). Despite the long tradition and practice of fish farming in some countries throughout the world, it is still considered as a new food production sector, but one that has grown rapidly over past fifty years. In the period from 1970 - 2008, the production of fish for consumption increased an average of 8.3% per year (Olivera *et al.*, 2013).

Plant extract posses negligible side effects, easy biodegradability, inexpensive and extracts that can be easily prepared. Plants generally produce many secondary metabolites such as tannins, alkaloids, steroids, lipids, flavonoids, etc which constitute an important source of inhibiting many pathogenic micro organisms. *A. hydrophila* is a gram negative rod shaped bacterium found in wide range. It is commonly isolated from freshwater. Freshwater fishes which are of commercial importance such as common carp, major carp and certain ornamental fishes are very much prone to the infection caused by this bacteria. *A. hydrophila* is recognized as a scourge of freshwater fish farming world

wide and is considered to be a major problem (Mythilpriya *et al.*, 2007).

Areca catechu is referred to as betel nut. It is used as psychoactive drug. The chemical components of areca nut have been used as anti-diabetic agent, blood pressure regulating agent, anti-ulcerogenic agent, antioxidants, anticonvulsant agent, central nervous system (CNS) stimulative agent etc.

Carica papaya referred as papaya, is a edible fruit which has numerous therapeutic properties. It is used as treat digestive problems and intestinal infections. It has a high anti-oxidant compounds and certain anti-depressant compounds. It is used for treating hemorrhoids and syphilis.

Eucalyptus camaldulensis is widely used in traditional therapeutic system. It has been used in the treatment of asthma, bronchitis, dental plaque, head ache, ulcer, bleeding gums. It has a appreciable anti- bacterial properties.

P.ambonius is traditionally used in the treatment of several disease like skin ulcerations, urinary disease, nervous disorders and congestive heart failure.

Ocimum basilicum have extraordinary medicinal properties and contains several anti-oxidant compounds, antiseptic agents, preservative agent, sedative and digestive regulator. The main objective of the this study is to evaluate the potential antibacterial activity of medicinal plants extracted with ethanol and distilled water.

The present study was analysed to compare the antibacterial activity of medicinal plant extracts against some common fish pathogen at different concentrations.

MATERIALS AND METHODS

An investigation was carried out evaluate the antibacterial property of *A.catechu*, *C.papaya*, *E.camaldulensis*, *P.ambonius*, *O.basilicum* against common fish pathogen *Aeromonas hydrophila*.

Selection, collection and authentication of plants

Fresh plant materials of *A.catechu*, *C.papaya*, *E.camaldulensis*, *P.ambonius* and *O.basilicum* were selected for the experiment, they were collected from in and around Coimbatore. The plants collected were authenticated by Botanical Survey Of India, Southern Circle, Coimbatore. Fresh leaves and nuts were collected, shade dried and powdered finely using electric pulverizer and stored in air tight container.

Preparation of plant extracts

10gm of plant powders were mixed with 100ml of ethanol. The ethanolic extract was extracted using Soxhlet apparatus for 72 hours. The extract was filtered using whatman filterpaper and stored at refrigerator at 4°C for further use.

Table 1: *In vitro* antibacterial activity of plant extracts against *A. hydrophila*.

Concentration of extracts mg/ml	ZONE OF INHIBITION IN mm				
	<i>Areca catechu</i>	<i>Carica papaya</i>	<i>Plectranthus ambonicus</i>	<i>Eucalyptus camaldulensis</i>	<i>Ocimum basilicum</i>
10	0	10.7	9.6	7.6	14.4
20	0	10.7	12	9.5	20.2
30	0	10.9	16.2	10.6	24.6
40	18	17	15.8	19.5	26
50	21.2	21	18.6	23	27

CONCLUSION

This study clearly shows that the leaf extracts of *O.basilicum* shows potential antibacterial activity against *A. hydrophila* in all the concentrations when compared to other plant extracts .So ethanolic extract of *O.basilicum* can be served as antibacterial agent to treat *A. hydrophila* infection in fishes.

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Collection and maintaince of test micro organism

The fish pathogen *A. hydrophila* was collected from the Department of Microbiology, PSG Institute of Medical Science and Research, Coimbatore. The bacterial culture was maintained at 37°C at Muller- Hilton medium (Himedia) for 24 hours at incubator.

In vitro antibacterial activity

Nutrient medium was prepared and wells are made by using gell cutter with the diameter of 6mm. (Olurinola, 1996) The bacterial culture were introduced into the media. Different ethanolic concentrations of the plant extracts were taken in the micropipette and were poured into the well. The culture plates were incubated at 37°C for 24 hours. After 24 hours the cultured plates are removed from the incubator and the zones of inhibitions are measures using millimeter scales and the readings are noted.

RESULTS AND DISCUSSION

The different ethanolic concentrations of plant extracts *A.catechu*, *C.papaya*, *P.ambonius*, *E.camaldulensis*, *O.basilicum* were evaluated for their antibacterial activity against the common fish pathogen *A. hydrophila*. Table-1 shows the antibacterial activity of ethanolic extracts of plants *A.catechu*, *C.papaya*, *P.ambonius*, *E.camaldulensis*, *O.basilicum*. The results of present study revealed that ethanolic concentration of leaf extract of *O.basilicum* posses potential antibacterial activity against *A. hydrophila* at 50% concentration followed by *E.camaldulensis* at 50% concentration.

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