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ANTI MYCOBIAL ACTIVITY OF *SESBANIA GRANDIFLORA* AND *CARICA PAPAYA* AGAINST FUNGUS ISOLATED FROM FRESH WATER FISH TILAPIA (*OREOCHROMIS MOSSAMBICUS)*

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ABSTRACT

The occurrence of fungi in cultured fishes are responsible for various health hazards to the consumers. In the present investigation extracts of *Sesbania grandiflora* and *Carica papaya* were screened for their antimycobial activities against the fungi isolated from fish samples. The isolated fungi include *A.flavus, A.niger, Cladosporium* and *Mucor*. Recently, management techniques over the control of molds using plant-based products are widely recommended. *Sesbania grandiflora* extract was found to be most effective against, *A.flavus* and *Cladosporium*, the inhibition zone being 37mm at 25% concentration and *Carica papaya* produced 36 mm inhibition againgt *Mucor*. So present study proves the possibility of using these plant extracts as antifungal agents.

Key words : Mycobial control, *Sesbania grandiflora* and *Carica papaya*

INTRODUCTION

Fish culture is an important industry. Various kinds of marine and freshwater fish have been cultured worldwide and the production of cultured fish increases every year. Infectious diseases are one of the most important diseases in fish and caused an economic loss in many aspects. It is caused by bacteria, fungus, virus and parasites (Plumb, 1999).

These pathogens are generally found on fish skin, gill, water and environment surrounding fish. In natural environment, fishes suffer from a variety of diseases due to the accumulation of pollutants in aquatic medium (Nedoluha and West huff, 1993). Fungal infections are responsible for a number of diseases in both marine and freshwater. Fungal infections are mainly caused due to immune suppression. Fungi can attack fishes of all the ages and it can also prevent successful hatching when it invades fish eggs. Among numerous aquatic fungi, species

oomycetes have special importance because of their effect on fish health a following economic loses (West, 2006).

Several species like *Pencillium sp, Alternaria sp, Fusarium solani* and *Aspergillus sp* are also reported (Firoz *et al.*, 2011). *Aspergillus mycosis* and *Paecilomyces marquandii* infection have been reported from culture tilapia(*Oreochromis sp).Paecilomyces mycosis* in red tilapia hybrids from Arizona, USA (Lighter *et al.*, 1998).Any kind and age of fish could be infected with water mold, including freshwater and estuarine fish (Noger, 1993)

Various antimicrobial agents have been used for the treatment of these diseases. The use of antimicrobial drugs in aquaculture has resulted in the development of more resistant strains (Smith *et al.*, 1994; Cabello, 2006).Medicinal plant has been used for the treatment of infectious diseases (Rios and Recio, 2005) and treatments with plants having antibacterial and antifungal activity are a potentially beneficial alternative in aquaculture (Abutbul *et al.*, 2005).Many of the spices and herbs have been valued for their antimicrobial effects and medicinal power in addition to their flavors and fragrance qualities (Ceylan *et al.*, 2004; Davidson *et al.*, 2005).Herbs act as an immune stimulatory conferring early activation to the non- specific defense mechanisms of fish and elevating the specific immune response. Herbs have also been used in other countries for control of fish diseases (Yen *et al.*, 2008).

Many studies proved that additives enhanced the growth of fishes and protected from diseases (Pandey and Madhuri, 2010). The herbal plants may be used as potential and providing source of pharmaceutical agents against fish pathogens in organic aquaculture (Mydeen *et al.*, 2011; Ravikumar *et al.*, 2010).

Sesbania grandiflora is commonly known as Agathi.*Sesbaniagrandiflora* belongs to the family Fabaceae. It is widely distributed in West Bengal, Karnataka, Tamilnadu and North eastern parts. It native of South East Asia, India. Traditionally the plants has been used for the treatment of headache and fever. The flower has been reported for antimicrobial activity (Wagh *et al.*, 2009; Kaul *et al.*, 2010)

Carica papaya is commonly known as papaya. It belongs to the family of Caricacceae. Several species of Caricacceae have been used as remedy against a variety of diseases. The medicinal folk the leaves poultice onto nervous pain and elephantoid growth (Read, 1976)

Therefore in this study aqueous extracts of three medicinal and edible plants were examined to determine the potential of their antifungal properties as an alternative prophylactics against fungal infection in tilapia.

MATERIALS AND METHODS

Collection and Extraction procedure

Carica papaya belongs to the family Caricaceae and *Sesbania grandiflora* belongs to the family Fabaceae were widely distributed in India. *Carica papaya* was commonly referred as "guava" and *Sesbania grandiflora* as "Agathi".The fresh leaves of *Carica papaya* and *Sesbania grandiflora* were collected, shade dried and ground into fine powder in an electric pulverizer. The powdered leaves were subjected to Soxhlet extraction using water as solvents. The extracts thus obtained were distilled and residues were separated by evaporation in water bath at 60°C and refrigerated.

Isolation of fungus:

One gram muscle from Tilapia fish was taken and grounded into paste using mortar and pestle and it was dissolved in 10 ml distilled water . This sample was used for serial dilution to isolate the fungal species. The medium used was Sabourds Dextrose Agar (SDA) medium.

Identification of fungus

With the help of sterilized inoculation hood different fungal colonies from the culture were taken and placed on separate the glass slides and teased. It was stained with the drop of lacto phenol cotton blue stain and cover slip was placed and these slide were viewed under the microscope. The identification was done the basis of conidial and colony characterization.

Invitro anti-mycobial activity

The agar well diffusion assay was adopted for evaluation of the anti-mycobial activities of *Carica papaya* and *Sesbania grandiflora* leaf extracts against fungus isolated from fish muscle. The Sabourds Dextrose Agar (SDA) medium was used for antifungal activity. From the residues, desired concentrations (1%, 5%, 10%, 15%, and 20%) were prepared using acetone as solvent. 20 µl of each concentration were aseptically filled in the well. All the treatments and acetone treated control were replicated three times. The plates were incubated for 24 hours at room temperature.

The efficiency of leaf extracts were recorded by measuring the diameter of inhibition zone at the end of 24-48 hours incubation.

RESULTS AND DISCUSSION

The impact of leaf extracts of *Carica papaya* and *Sesbania grandiflora* against mycoflora isolated from fish muscle

	Treatments	*A.niger*	*A.flavus*	*Mucor*	*Cladosporium*
Carica papaya	5%	19	18	21	15
	10%	21	20	26	21
	15%	24	26	28	26
	20%	26	28	33	29
	25%	33	34	36	35
Sesbania grandiflora	5%	18	10	28	25
	10%	19	16	29	28
	15%	21	24	31	32
	20%	24	35	34	32
	25%	26	37	37	36

The antifungal activity of *Sesbania grandiflora* was found to be maximum in 25% concentration producing 37mm inhibition against *Aspergillus flavus* and *Mucor and 36 mm against Cladosporium*. This was followed by 25% concentration *Carica papaya* against *Mucor* producing 36 mm inhibition. The minimum inhibitory effect was recorded by 5% concentration of Sesbania grandiflora against *Aspergillus flavus* (10mm). This was similar to the findings of the antimicrobial activity of crude leaf powder and nanosized leaf powder against *A.niger* , *yeast* and bacteria like *P.aureus* , *Candida albicans etc.* According to him *Sesbania grandiflora* crude extract exihibited 64% inhibition and nano sized leaf powder produced 89% inhibition

against *Aspergillus species*. The antimicrobial activities of nanosized leaf powder were very potent due to its uniform size when compared with crude leaf powder. So leaf *Sesbania grandiflora* exhibited antifungal activity to inhibit the growth fungus.

The active compounds present in the leaf of *Sesbania grandiflora* are considered to the excellent source of vitamin C and calcium. Pectin and safanine are also found in leaves of this plants, diuretic and tonic in the form of poultice and they are applied to bruises (Devadata *et al.*, 1954).

In the present study *Carica papaya* extract at 25% concentration produced an inhibition zone of (36mm) against *Mucor*, followed by 35mm inhibition against *Cladosporium*. According to our research finding regarding the qualitative analysis of *Carica papaya* leaf extract, except steroids and tannins all the possible phytochemical constituents were present .The extract possessed carbohydrates, protein, anthraquinones, flavonoids, saponins and alkaloids as mentioned. These finding were in agreement of similar nature of study conducted in past in which researches did not find tannins rather thanother substance like saponins, glycosides and alkaloids. Moreover flavonoids are very important consititute of natural product and have got a part antitoxidant activity and also unability to combact tumor growth (Ayoola, 2010; Okww, 2004).So the present study proves the possibility using of the plants extract *Sesbania grandiflora* and *Carica papaya* as antifungal agents.

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