

# STUDIES OF ANTI BACTERIAL STRENGTH OF THE MARINE FUNGAL METABOLITES ISOLATED FROM DIFFERENT AREA OF EAST COASTAL REGION

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**Abstract:** The marine environment is an extremely complex ecosystem and contains a broad spectrum of fungal diversity. Marine fungi were isolated from water and sediment samples from different sites. Fungal isolates were recovered and morphologically most of the strains belonged to the fungal genera such as *Aspergillus* and *Penicillium*. Antimicrobial substance from marine fungi was produced by agar plate method. The potent fungal were inoculated on production medium and extracted was done. The extracted compound was checked for antimicrobial activity against microbial pathogens such as *Bacillus subtilis*, *Escherichia coli*, *Klebsiella aerogenes*, *Staphylococcus aureus* etc. The results showed maximum zone against *E. coli*. In most of the researches, strains belonging to fungal genre *Aspergillus* (*Aspergillus niger*, *Aspergillus welwitschiae*) as potential candidate offering a better scope for the production, purification and isolation of broad spectrum antimicrobial compound.

**Keywords:** Marine fungi, antimicrobial activity, secondary metabolites, microbial pathogens, *Aspergillus*

## INTRODUCTION:

Marine world has provided a useful platform where marine organisms are significantly exploited for the production of useful products of human use. Nowadays, various pharmacological and therapeutic products of medicinal importance are obtained and actively sought from the marine world.

Fungal species that live in marine environments are marine fungi. Different communities of fungi vary with the marine habitat. It is impracticable to culture most of the fungi but their nature can be investigated by examining seawater samples and undertaking rDNA analysis of the fungal material found. *Aspergillus* fungi have received the most of the attention among all the marine-derived fungi, which accounted for 31% of the marine fungal origin.

Antibacterials and antifungals are among the most commonly used drugs. Due to the adverse living conditions, salinity, nutrition, higher pressure, temperature variations, competition with bacteria, viruses and other fungi, marine fungi have proved to be wealthy sources for the isolation of new biologically natural products, and may have developed specific secondary metabolic pathways compared with terrestrial fungi. Current scenario of research investigations on marine filamentous fungi for the isolation of biologically active secondary metabolites has confirmed a remarkable potential of them as a source of new marine drugs. A number of compounds of biological significance such as cytoglobosins and halovirs have been isolated from marine fungi, giving a further lead to exploit marine fungal biodiversity in order to isolate more effective and remarkable compounds from marine fungi with multitude of biological potential. In the last decade, many novel bioactive natural products from marine fungi have been discovered that possess cytotoxic, anticancer, antiviral, antibacterial or antifungal activities.

## REVIEW:

**Daila A.M.Abdou et al. (2016)** Isolation and characterization of marine fungal metabolites were tested against human pathogens. This research was aimed at extracting the antimicrobial compounds from marine fungi. The fungi were isolated from three different sites in Egypt (Red Sea, Mediterranean Sea and Bitter Lakes) and were inoculated in nutrient agar plated. The antimicrobial agents were extracted from them using industrial solvents hexane, chloroform, dichloromethane and ethyl acetate (all of equal volumes). These extracts were used to do antimicrobial assays against human pathogens. 17 fungal were obtained of which 14 belonged to genus *Aspergillus*, two belonged to *Penicillium* and one belonged to *Cladosporium*. *Aspergillus niger* showed effective antimicrobial activity among them.

**Rajasekar et al. (2012)** Antimicrobial agents from plants have been more common but antimicrobial agents from fungi are now on the cards for research. The objective of the research is to isolate and identify the marine fungal metabolites against clinical pathogens. Samples were collected from different sites of Sundarbans mangrove, Muttukadu and

Parangipettai. They cultured the isolates in agar plates and extracted the secondary metabolites. Thirty fungal isolates were recovered and ten different strains belonged to fungal genera *Fusarium*, *Aspergillus*, *Mucor* and *Penicillium*. The results displayed maximum zone in 10mm against *E. coli*. The most potent isolate turned out to be *Fusarium sp.*

**Phan Thi Hoai Trinh et al. (2018)** Isolation and screening antimicrobial properties of 100 fungus strains from different marine sources at Nha Trang Bay, Vietnam. They prepared the pure culture of marine fungi and crude extract in ethyl acetate from the samples. Antibacterial activity was screened against pathogens *B. cereus*, *E. coli*, *S. aureus*, *P. aeruginosa*, *L. monocytogenes*, *S. faecalis* and *C. albicans*. The fungi were identified according to its gene sequences of 28S rDNA. Sequences of fungi compared with those in the NCBI. Totally 100 fungal isolates were obtained from various marine samples. Highest isolation frequencies were obtained from the brown algae *Sargassum sp.* and the sponge *Aaptosuberitoides*. Antibacterial activity was determined in approximately 68 isolates. The results indicated that 50% of isolates showed antibacterial activity against *L. monocytogenes*, 49% against *B. cereus* and 45% against *S. faecalis*. 57% of fungal strains were tested against *S. aureus*, only 7% and 2% against *E. coli* and *P. aeruginosa* respectively. Two of five fungal strains with highest antimicrobial activity are identified. Three of these strains were classified as *A. flocculosus* illustrated significant antimicrobial activity against pathogens tested.

**Vivek K. Bajpai et al. (2014)** Marine fungi are set to have wide range antimicrobial, anti-fungal, anti-protozoan, anti-allergic and anti-tumor activity. Studies are conducted in Clastospordium to find whether they are able to produce antibiotic and antifungal compounds. Metabolites like equistone and phomasetin which were derived from *Fusarium heterosporum* showed antiviral activity against HIV. Those metabolites are studied for industrial and pharmaceutical importance. Cyclic lipopeptide daptomycin has found to work against skin infection.

**Nazura Zainuddin et al. (2010)** Isolation and characterization of marine fungal metabolites were tested against human pathogens. The fungi were isolated from three different sites in peninsular Malaysia and were inoculated in nutrient agar plated. In a systematic screening effort, extracts of marine fungi were investigated for antimicrobial activity. The plug assay method was used to screen 152 strains for antimicrobial activity. 82 of these exhibited antimicrobial activity, 90.2% of them exhibited antibacterial activity and 9.6% exhibited antifungal activity. Five fungal strains with highest antimicrobial activity are identified and further tested for biological activity by the disc diffusion assay method. *Fasciatispora nypae* showed a wide range of antibacterial and antifungal activity.

**Kalayani et al. (2017)** Isolation and characterization of marine fungal metabolites against human pathogens. This research was aimed at extracting the antimicrobial compounds from marine fungi. The fungi were isolated from different sites of Bay of Bengal and were inoculated in nutrient agar plated (potato dextrose agar). The mycelia were removed and the agar was cut into pieces. The antimicrobial agents were extracted from them using industrial solvent ethyl acetate (1:1). These extracts were used to do antimicrobial assays against human pathogens such as *Streptococcus pyrogenes*, *Bacillus coagulans* etc. Among them *Aspergillus fumigatus* showed very good antimicrobial activity.

#### CONCLUSION:

The studies have revealed that the diversity of culturable marine fungi with high antimicrobial activity could be found from various habitats. Out of all the isolates against the pathogens like *Bacillus subtilis*, *Escherichia coli*, *Klebsiella aerogenes*, *Staphylococcus aureus* etc. strains mostly belonging to fungal genre *Aspergillus* possessed maximum antimicrobial activity. Particularly, strains classified as *Aspergillus niger* and *Aspergillus welwitschiae* illustrated significantly antimicrobial activity to pathogens tested. Therefore, advanced studies of these potential fungal strains for bioactive secondary metabolites need to be conducted for further application.

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