

RESEARCH ARTICLE

In-vitro* antimicrobial activity of fungi from extreme environment*Bari Kishor P and Unnati Padalia**

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Manuscript details:	ABSTRACT
<p>Available online on http://www.ijlsci.in</p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as: Bari Kishor P and Padalia Unnati (2015) <i>In-vitro</i> antimicrobial activity of fungi from extreme environment, <i>Int. J. of Life Sciences</i>, Special Issue, A5: 92-94.</p> <p>Copyright: © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>Fungi are known to produce a vast array of secondary metabolites that are gaining importance for their biotechnological applications. In the present study, two fungal isolates which can grow at alkaline condition were screened for antimicrobial activity. Antimicrobial activity was studied using cell free extract. One out of two fungi exhibited antimicrobial activity against <i>Staphylococcus aureus</i> and <i>Bacillus subtilis</i>. Besides fungal metabolite, extraction was also carried out using methanol.</p> <p>Keywords: Fungi, Antimicrobial activity, Extraction, Fungal metabolites.</p>
	<p>INTRODUCTION</p> <p>To survive in the environment and compete with the other microorganisms for resources many microorganisms produce antimicrobial compounds to inhibit or kill other competing strains including human and animal pathogens (Borgave <i>et al.</i>, 2012). Fungi are common in nature and considered as good natural sources for antimicrobial agents (Tawfik and Halla, 2012). Secondary metabolites are small molecules that are not directly involved in metabolism and growth of the organism. Both plants and fungi are known for producing a large number of chemically diverse secondary metabolites (Abulwahid <i>et al.</i>, 2013). The identification of the microorganisms that produce bioactive compounds is of great interest in the development of new molecules to fight against many pathogens.</p> <p>MATERIAL AND METHODS</p> <p>Screening of the fungal isolates</p> <p>Fungal isolates were inoculated into Sabouraud Dextrose broth (pH-</p>

11) and incubated for 10-12 days at 25°C. Cell free extract was prepared by filtration using membrane filtration assembly with 0.45 micron cellulose acetate filter paper. The filtrate was collected by applying vacuum in a flask. This filtrate was used for antimicrobial assay. Antimicrobial assay was carried out by agar well diffusion method.

The 24hr old cultures of the test organisms *Staphylococcus aureus*, *Bacillus subtilis*, *Pseudomonas aeruginosa* and *Escherichia coli* were streaked on sterile Muller- Hinton (MH) agar with the sterile swab. The wells were made on MH agar. The wells were filled with the cell free extract obtained by filtration as well as with the methanol extract. These plates were incubated at 37°C for 24hrs then diameter of zone of inhibition was noted.

RESULTS AND DISCUSSION

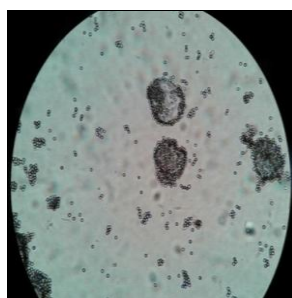
Abdulwahid *et al.* (3) extracted and characterised antibacterial compound from *Aspergillus niger*. They had studied antimicrobial activity of these fungus on organisms isolated from infections of the patients.

Swathi *et al.*, (2013) characterised the secondary metabolites from marine fungi *Microascus* *sps.* They had studied antimicrobial activity against the *S. aureus*, *E.coli*, *S. mutans*, *Candida albicans*. They found good antimicrobial activity against *E.coli* and *Candida albicans* as compared to other pathogens.

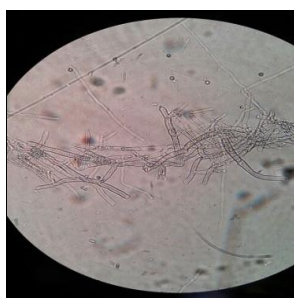
Samuel *et al.* (2014) studied antimicrobial activity of the fungi from Kubah National Park, Kuching, Sarawak, Malaysia. They had tested fungal isolates against *E.coli*, *Listeria monocytogenes*, *Salmonella enteritidis* and *Klebsiella pneumonia*. Six fungal isolates showed strong antimicrobial activity against the test bacteria.

Eric *et al.* (2013) found new effective antimicrobial assay of filamentous fungi. This bioassay also provided a way for studying the production dynamics of antimicrobial compounds of filamentous fungi.

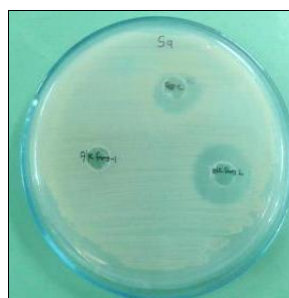
Manimegalai *et al.* (2013) investigated secondary metabolite content of marine fungal strain *Cephalosporium acremonium* and *P. citrinum*, showed broad spectrum activities.



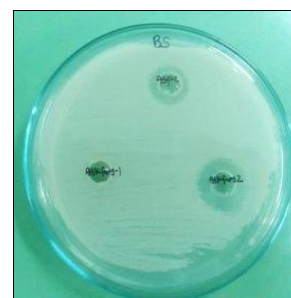
Species 1



Species 1



Staphylococcus aureus



Bacillus subtilis

Fig. 1: Wet mount of alkaliphilic fungus under 45X

Table No.1: Zone of inhibition results by cell free extract of the alkaliphilic fungi 1 and 2

	<i>Staphylococcus aureus</i> ATCC 6538	<i>Bacillus subtilis</i> ATCC 6633	<i>Pseudomonas aeruginosa</i> ATCC 15442	<i>Escherichia coli</i> ATCC 8739
Alkaline fungus-1	0	0	0	0
Alkaline fungus-2	21 mm	18 mm	0	0
Standard culture <i>Aspergillus niger</i>	15.5 mm	14 mm	0	0

Table No.2: Zone of inhibition results by methanol extract of the alkaliphilic fungi 1 and 2

	<i>Staphylococcus aureus</i> ATCC 6538	<i>Bacillus subtilis</i> ATCC 6633	<i>Pseudomonas aeruginosa</i> ATCC 15442	<i>Escherichia coli</i> ATCC 8739
Alkaline fungus-1	12.5 mm	0	0	0
Alkaline fungus-2	13 mm	0	0	0
Standard culture <i>Aspergillus niger</i>	12 mm	0	0	0

CONCLUSION

The isolated alkaliphilic fungi were screened for their antimicrobial activity against pathogens by agar well diffusion method. Antimicrobial assay was carried using cell free extract. Metabolite of the alkaliphilic fungus-2 was showing better antimicrobial activity compared to alkaliphilic fungus-1 against *Staphylococcus aureus* and spore bearer *Bacillus subtilis*.

The extraction of the fungal metabolites was carried out with methanol. The study revealed that antimicrobial activity of both alkaliphilic fungi was found to be reduced after extraction with the methanol. Methanol was not suitable for the extraction of these fungal metabolites.

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