ANTIMICROBIAL ACTIVITY OF SELECTED FUNGI ISOLATED FROM DEE AND BARRIENTOS ISLANDS, ANTARCTICA

SHAMIA MOHAMEDAIN ABD ELGADIR YOUNIS
(SGF070004)

INSTITUTE OF BIOLOGICAL SCIENCE
FACULTY OF SCIENCE
UNIVERSITY OF MALAYA
KUALA LUMPUR

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DEDICATION

A very special compliments to my mother and my husband for the endless support, love and patience during my whole study and while I was writing my thesis. Your lovely support helped me when I needed it the most.

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ABSTRACT

This study reports the screening of selected fungi isolated from Dee and Barrientos Islands, Antarctica, for their antimicrobial activities using two methods: a) plug assay method and b) disk diffusion method. The plug assay was carried out as preliminary screening for biological activity against bacteria: *Bacillus subtilis, Staphylococcus aureus, Escherichia coli*, *pseudomonas aeruginosa,* and yeast: *Candida albicans*. The results showed that 35% from species possessed antibacterial activity; and these included: *Geomyces* sp.50-1/S_7, Unidentified 75-1/S_1, *Geomyces* sp.12-1/S_{21}, *Penecillium* sp.75-1/S_{10}, *Geomyces* sp.3-1/S_5, *Geomyces* sp.3-4/S_5 and *Geomyces* sp.146/S_5. Most of the strains exhibited antibacterial activity against Gram-positive bacteria *S. aureus* and *B. subtilis* and no activity detected against yeast.

The disk diffusion assay was carried out to confirm the bioactivity of selected fungi against bacteria: *Bacillus subtilis, Staphylococcus aureus, Escherichia coli*, *Pseudomonas aeruginosa, Bacillus cereus,* and yeasts: *Candida albicans, Saccharomyces cerevisiae* and *Schizosaccharomyces pombe*. In disk diffusion assay, crude ethyl acetate extracts of five strains of *Geomyces* species namely, *Geomyces* sp.50-1/S_7, *Geomyces* sp.12-1/S_{21}, *Geomyces* sp.3-1/S_5, *Geomyces* sp.3-4/S_5 and *Geomyces* sp.146/S_5, were selected for antimicrobial assay. The selection of these five strains was based on their good activity which they produced during the preliminary screening. These five strains were cultivated on Potato dextrose broth (PDB) under stationary phase for three different incubations periods 10, 15 and 21 days. The strains exhibited activity after 15 days incubation then, the activity decreased.

The results showed that, no activity was detected against yeast and *Geomyces* sp.50-1/S_7 and *Geomyces* sp.12-1/S_{21} was lost their activity and this may be due to inconvenient liquid growth medium.

Minimum inhibitory concentration of the active extracts was carried out against; *B. subtilis, S. aureus, B. cereus* and *P. aeruginosa* and the values ranged between 6.25 mg ml^{-1}- 25 mg ml^{-1}. Minimum bactericidal concentration was determined after subculture on to Luria Agar media and the values ranged from12.5 mg ml^{1} to 25 mg ml^{-1}.

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SYMBOLS AND ABBREVIATIONS

˚C	degree celsius
$DMSO_4$	dimethyl sulfoxide
MIC	minimum inhibitory concentration
MBC	minimum bactericidal concentration
sp	species
µl	micro litre
%	percentage
EtOAc	ethyl acetate
$BaCl_2 2H_2O$	barium chloride dehydrate
µl	micro litre
$mgml^{-1}$	miligrame per mililitre
B. subtilis	*Bacillus subtilis*
C. albicans	*Candida albicans*
S. cerevisiae	*Saccharomyces cerevisiae*
S. pombe	*Schizosaccharomyces pombe*
S. aureus	*Staphylococcus aureus*
B. cereus	*Bacillus cereus*
E. coli	*Escherichia coli*
P. aeruginosa	*Pseudomonous aeruginosa*