

Antimicrobial activity of cyanobacteria against bacteria, fungi and fish diseases: Production and characterization

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Cultures of the blue green algae (cyanobacteria) *Anabaena wisconsinense*, *Oscillatoria curviceps* and *Nostoc muscorum* were isolated from fish farms and their antimicrobial effects were studied. Solvent extracts of exponential phase algae were screened for antimicrobial activity against different species of gram positive (*Lactobacillus* sp. and *Bacillus firmus*) and gram negative (*Aeromonas Hydrophila*, *Pseudomonas fluorescens* and *Pseudomonas anguilliseptica*) bacteria and the fungi (*Aspergillus niger* and *Saprolegnia parasitica*) which were all isolated from diseased fish. Maximum antimicrobial activity was observed with ethanolic extract of *O. curviceps* against *Lactobacillus* sp. and *Aeromonas Hydrophila*, whereas, methanol extracts of *A. wisconsinense* and *O. curviceps* had antibacterial effects against *B. firmus*, *A. Hydrophila*, *P. fluorescens*, *P. anguilliseptica*, and the fungi *A. niger* and *S. parasitica*. It was also observed that solvent extracts of *A. wisconsinense* when injected into *Oreochromis niloticus* which was already injected intraperitoneally with 2×10^6 CFU/ml, *P. Anguilliseptica* significantly decreased fish mortality from 50 to 12.5%.

The cyanobacterium *Nostoc muscorum* exhibited antagonistic activity against gram-positive and gram-negative bacteria and filamentous fungi. The results indicated that the active substance produced maximally after 12 days of incubation in shaken culture at 35°C, at pH 8.0 in BG-11 medium. The antagonistic material was purified using thin layer chromatography. The compound showed maximum absorption at 240 nm. Infrared (IR) and nuclear magnetic resonance (NMR) indicated presence of γOH , γCH aromatic, γCH aliphatic, $\gamma\text{C}=\text{N}$, $\gamma\text{C}=\text{O}$, $\gamma\text{C}=\text{C}$ and C-O. Mass spectroscopy indicated that its molecular weight is 279. The results also indicated that the compound is phenolic compound.

Biography

Mostafa M. El-Sheekh has completed his Ph.D. in 1991 as channel system fellowship between Tanta University, Egypt and Goettingen University, Germany. He has done postdoctoral studies in Hungary, Czech Republic, Japan, Sweden, India and he was visiting Professor in different universities worldwide in Turkey, Azerbaijan, Morocco, Algeria. He organized and attended many international conferences and workshops in Spain, Algeria, Egypt, India and USA. He published more than 72 papers in local and international journals and there another 6 papers under reviewing and more than 10 papers under preparation. He has now 5 research projects. And he is supervising 18 Ph.D. and M.Sc. students in different universities in Egypt. He is reviewer and editor in more than 45 international journals.

Phytochemical and antimicrobial investigation of *Capparis deciduas* of Cholistan desert, Pakistan

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The present investigation reveals phytochemical and antimicrobial study of *Capparis deciduas*. The phytochemical study was subjected by GC-MS and antibacterial and antifungal activity was carried out by agar well diffusion method and test tube dilution method respectively. The GC-MS analysis of the n-hexane extract showed the presence of twenty compounds namely: tetradecane (1), tetradecane (2), heptadecane, 2,6,10,15-tetramethyl-(3), hexadecane (4), 1-dodecanal, 3,7,11-trimethyl-(5), eicosane, 7-hexyl (6), bicyclo [4.4.0] deca-5-ene, 1,5-dimethyl-3-hydroxy-8-[1-methylene-2-hydroxyethyl]-1 (7), tetradecane, 2,6,10-trimethyl (8), oxacyclotetradeca-4,11-diyne (9), heptadecane, 9-hexyl (10), benzene, [1-propylheptadecyl] (11), benzene, [1-ethylnonyl] (12), tetradecane, 2,6,10-trimethyl (13), benzene, [1-methyldecyl]- (14), tetradecane, 2,6,10-trimethyl (15), benzene, [1-butyl-octyl] (16), octadecane, 6-methyl (17), ethanol, 2-[octadecyloxy] (18), hexadecane, 1-chloro (19), hexadecanoic acid, ethyl ester (20). The antimicrobial activity of different extracts of the aerial parts of the *Capparis deciduas* indicated that ethanolic extract showed more antibacterial activity against two gram positive and two gram negative bacteria while acetone extract showed least antibacterial activity. Similarly ethanolic extract showed maximum percentage of inhibition growth against *Helminthosporium sativum* and *Fusarium moniliforme*.

Biography

Nadeem Ahmed is a Ph.D. scholar in Department of Plant Science, Quaid-i-Azam University, Islamabad. He is doing research on medicinal flora of Cholistan desert. He isolated several useful compounds from these medicinal plants and going to patent these compounds. He is performing anticancer assays of these useful compounds in University of Hawaii, USA.