DETERMINATION OF INVINTRO LETHALITY OF ACTINOMYCETES ANTIBIOTIC EXTRACTS FROM MENENGAI CRATER GEOTHERMAL VENTS, KENYA

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ABSTRACT

Drug resistance is a serious threat to human existence today. This study investigated sensitivity of selected pathogenic microorganisms to antibiotic extracts from soils of Menengai crater geothermal vents in Kenya. Antibiotic producing actinomycetes were isolated from geothermal vents and identified using colony characteristics and biochemical means. Sensitivity of selected pathogenic microorganism was carried out using primary and secondary screening techniques. Four actinomycetes coded PAN 9, PAN 18, PAN 117 and PAN 138 were selected for further analysis based on the size of zone of inhibition and broad spectrum of activity. Extraction of antibiotics was carried out using ethyl acetate. Sensitivity test of the pathogens to the extracts was done using Karby Bauer disk diffusion technique and Cytotoxicity of antibiotic extracts carried out using Brine shrimp lethality test and sheep blood hemolytic bioassays. Isolates presented typical actinomycetes characteristics. A total of 20 actinomycete isolates showed antagonism against the test pathogenic microorganisms. Selected actinomycetes inhibited growth of Gram positive and negative bacterial and fungal pathogens in both primary and secondary sensitivity tests. There was a significant difference in the diameters of zones of inhibition produced by the test pathogens when subjected to antibiotic metabolites from the selected actinomycetes ($F = 6.6046$ $P = 0.001338$). The minimum inhibitory concentration and minimum bactericidal concentration/minimum fungicidal concentration did not vary significantly ($F=0.4503$, $P = 0.7187$). The LC_{50} values of the antibiotic extracts varied from 2.438±0.47µg in PAN 9 to 9.3455±0.41µg in PAN 138. PAN 19 and PAN 117 showed partial hemolysis while PAN 9 and PAN 138 exhibited complete hemolysis of sheep erythrocytes. There is need to purify and conduct structural elucidation of these antibiotics to determine whether or not the observed hemolysis resulted from the said antibiotics or other compounds in the extract.

Keywords: *Actinomycetes, Antibiotic, Extracts, Cytotoxicity, Invitro*