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"Study of Phenotypic Characterization in Case of an Actinomycetes Isolated from Air"

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Abstract – This paper presents on actinomycetes from poles apart from world. Tremendous circumstances reported as huge antibiotic producers. Actinomycetes from different environs demonstrate extraordinary possessions of various metabolite productions. This paper is based on molecular pattern of Actinomycetes isolated from air (Kumar. A, et.al 2008) as well as the various metabolites, forcefully antibiotics.

Keywords:- Actinomycetes, Molecular, Antibiotic, Air.

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INTRODUCTION

Microorganisms are the main colonizers of the earth, bestowed with inherent physiological and functional diversity and have found applications in agriculture, medicine, industry and environment. Among the various industrially important microorganisms, actinomycetes are of prime importance and are primarily recognized as organisms of academic curiosity and producers of antibiotic compounds and biologically active secondary metabolites. Actinomycetes population has been identified as one of the major group of soil population, which may vary with soil type. Apart from soil, they are found in marine and terrestrial environments and also exist in symbiotic association with plants and other living organisms. The important genera of actinomycetes are Streptomycetes*,* Nocardia*,* Micromonospora*,*Ther momonospora, Actinoplanes, Microbispora, Streptosporangium, Actinomadura, Actinosynnema, Dactylosporangium, Rhodococcus, Actinosynnema Kitasatospora, Gordona, Intrasporangium *and* Streptoalloteichus*. Actinomycetes from thegenera* Actinoplane*,*Streptomyces *and* Actinopolysp ora have been reported to produce a number of broad-spectrum antibiotics. Apart from production of antibiotics, actinomycetes have been looked upon as potential sources of bioactive compounds and they are the richest sources of secondary metabolites. Actinomycetes synthesized about two-thirds of currently reported bioactive substances belonging to a great variety of chemical groups. Diversity and bioactivity of actinomycetes are well documented in various normal ecosystems all over the world. Actinomycetes also produce industrially important enzymes like cellulase, xylanase, pectinase, amylase, lipase and protease. Many actinomycetes also produce siderophores which have agricultural and clinical applications [1]. Actinomycetes producing bioactive compounds with angiogenic or wound healing properties [2] and anti-tumorigenic properties have also been reported [3]. New bioactive compounds of anthraquinone nature with potent antimicrobial, antitumor, anti-inflammatory and antiviral activities have also been reported from soil actinomycetes and its antitumour activity studied [4].

Antibiotics are the best known products of actinomycete. Over 5,000 antibiotics have been identified from the cultures of Grampositive and Gram-negative organisms, and filamentous fungi, but only about 100 antibiotics have been commercially used to treat human, animal and plant diseases. The genus, Streptomycete, is responsible for the formation of more than 60 % of known antibiotics while a further 15 % are made by a

number of related Actinomycetes, Micromonospora, Actinomadura, Streptoverticillium and Thermoactinomycetes [5]. Antibiotics, because of their industrial importance, are the best known products of actinomycetes. The actinomycetes produce an enormous variety of bioactive molecules, e.g., antimicrobial compounds. One of the first antibiotics used is streptomycin produced by Streptomycin griseus.

CHARACTERIZATION OF ACTINOMYCETES:

The potent Actinomycetes isolates selected from primary screening were characterized by morphological, biochemical and physiological methods. The morphological method consists of macroscopic and microscopic characterization**.** Macroscopically the Actinomycetes isolates were differentiated by their colony characters, e.g. size, shape, color, consistency etc. For the microscopy, the isolates were grown by cover slip

culture method (Kawato & Sinobu 1979). They were then observed for their mycelial structure, and conidiospore and arthrospore arrangements on the mycelia under microscope (1000X). The observed morphology of the isolates was compared with the Actinomycetes morphology provided in Bergey's Manual for the presumptive identification of the isolates.

MORPHOLOGICAL AND BIOCHEMICAL CHARACTERIZATION:

Only actinomycetes isolates that gave positive results in the screening for antimicrobial activity were characterized morphologically and physiologically. Phenotypic characteristics like aerial mass colour, reverse side pigments, morphology of spore chain, consistency, Gram's staining, growth on actinomyces media, growth on *Streptomyces* media, etc. were done. The spore chain morphology was determined by direct microscopic examination using the 10 days old cultures under a compound light microscope (Nikon, Japan) using 1000X magnification power. The observed structures were compared with Bergey's Manual of Determinative Bacteriology, ninth edition, and the organisms were identified. Bio-chemical characterization of actinomycetes was done by esculin hydrolysis, starch hydrolysis, casein hydrolysis, glucose utilization, sucrose utilization, citrate utilization, nitrate reduction, urea hydrolysis, catalase test and IMVic test, acid production from sugars, NaCl resistance and temperature tolerance.

CONCLUSION:

In this paer diffusible pigment of actinomycetes isolates were determined on the basis of morphological characterization and most of the actinomycetes isolates showed positive results for catalase, starch utilization, and casein utilization and others also.

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