

**ISOLATION AND MORPHOLOGY IDENTIFICATION OF
ACTINOMYCETES SHOWING ANTIBACTERIAL ACTIVITY
AGAINST HUMAN PATHOGENIC BACTERIA**



By

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ABSTRACT

Antimicrobial resistance (AMR) is a growing public health threat that occurs when pathogens like bacteria, viruses, fungi, and parasites develop the ability to resist the drugs designed to kill them. This resistance makes infections harder to treat and increases the risk of disease spread, severe illness, and death. Actinomycetes are a diverse group of gram-positive bacteria that are known to produce a wide range of bioactive compounds and offer a promising alternative in the fight against resistant microbes. The study aim is to isolate and morphology identify actinomycetes from different soil surroundings in the Eastern University premises, demonstrating strong antibacterial effects against prevalent human pathogens. Nine different actinomycete strains were obtained and identified morphologically and with the help of biochemical tests such as gram staining. The results of Gram staining also indicated that all the isolates were Gram-positive due to their thick cell walls and their high capacity to produce antibiotics. In antibacterial activity screening, several strains showed significant efficacy against common human pathogens, *Escherichia coli* and *Staphylococcus aureus* ($P < 0.05$). Notably, strains labelled A1, F1, and S1 demonstrated broad-spectrum antibacterial properties, suggesting their potential as sources of new antibiotics. The improved antibacterial efficiency and the greater colony-forming ability of the strains obtained from the swamp area prove the impact of the environment on actinomycetes' growth and activity ($P < 0.05$). Physio-chemical analysis of the soil samples found that the swamp area's neutral pH, high moisture, and rich organic content provided a conducive environment for actinomycetes proliferation ($P < 0.05$). These findings highlight the critical role of environmental factors in shaping actinomycetes' diversity and antibacterial potential. This study helps to better comprehend the factors of actinomycetes distribution in various types of soils and indicates the directions for searching new antibiotics.

Key words: Antimicrobial Resistance, Actinomycete, Antibiotic, Antibacterial Potential

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