

Isolation of Actinomycetes with Antibacterial Activity from Soils in Dunumadalawa and Gannoruwa Forest Reserves, Kandy Sri Lanka

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Infectious diseases are increasingly challenging to treat due to the rapid emergence of multi-drug-resistant pathogenic strains, particularly multi-drug-resistant bacteria. Therefore, the development of novel, effective antibiotics is a timely and urgent need. Most of the commercially available antibiotics are originally isolated from actinomycetes and soil is a rich source of actinomycetes. Hence, the isolation of soil actinomycetes from unexplored, niche habitats like natural forests are attractive sources for novel antibiotics. The current study was carried out to isolate and screen antibiotic-producing actinomycetes strains from soils in Dunumadalawa and Gannoruwa natural forest reserves, Kandy, Sri Lanka. Two soil samples were collected from each site and bulked and homogenized to obtain a composite sample. Soil samples were analyzed for physicochemical parameters (PH and temperature). Each sample was pretreated, serially diluted, and grown in Actinomycetes Isolation Agar (AIA) medium, incubated at 28 °C for 48 hours. Gram staining and morphological identification were performed. The perpendicular streak method was used to check the initial inhibitory activity of isolated actinomycetes against test organisms *E. coli*, *S. aureus* and *P. aeruginosa*. Isolates that showed activity during perpendicular screening were subjected to the secondary screening by performing an agar well diffusion assay. The soils of both sites were acidic in nature. A total of 13 actinomycetes isolates were isolated. Out of these 13 isolates, two isolates showed antibacterial activity against *E. coli* while one isolate showed antibacterial activity against *S. aureus*. Interestingly one isolate showed activity against both *E. coli* and *S. aureus* exhibiting broad-spectrum activity. Inhibitory activity against *P. aeruginosa* was not observed from any isolates. It can be concluded that the exploration of natural forest reserves with higher biodiversity contributes to the development of new antibiotics and the isolates with antibacterial activity from this preliminary study should be further investigated in the future.

Keywords: Actinomycetes, Soil, Antibiotic resistance, Isolation, Screening