Preliminary study to identify actinomycetes with antibacterial activity from soil samples around Kandy, Sri Lanka

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Introduction and Objectives: Commercially exploited antibiotics were originally isolated from Actinomycetes. Even so, Actinomycetes still remain unexplored for antibacterial potential. This study was carried out to isolate and identify actinomycetes with antibacterial activity from soil samples from Kandy, Sri Lanka.

Methods: Soil was taken from five different habitats in the Kandy district (waste disposal (WS), originally cultivated (OR), riverbanks (RB), pasture (PS) and Rhizospheric soil (RH)). The pH and temperature of each sample were measured during collection. Each sample was pre-treated, serially diluted and grown on an Actinomycetes isolation agar medium (Sigma-Aldrich), incubated at 30 °C for 48 hours. The morphology of the colonies was observed, and Gram staining was done. Isolates were screened for antibacterial activity against *Escherichia coli (*ATCC25922) *Staphylococcus aureus* (ATCC25923), *Pseudomonas aeruginosa* (ATCC27853) and *Klebsiella pneumoniae* (ATCC13883) using the perpendicular streak method

Results: Twenty-one isolates were identified, six from the WS site, six from the OR site, six from RB, two from PS and one from RH. Of these, 19 isolates were identified as actinomycetes by Gram stain and morphological characterization and two were identified as gram-positive bacilli. Antibacterial activity is shown in Table 1 based on the zone of inhibition. There was no zone of inhibition against *Klebsiella pneumoniae* for any of the isolates.

Table 1. Zone of inhibition (ZOI) against test organisms.

Isolate No.	ZOI against *Staphylococcus aureus* in mm $\pm$ 1	ZOI against *Escherichia coli* in mm $\pm$ 1	ZOI against *Pseudomonas aeruginosa* in mm $\pm$ 1
OR4	7	8	-
RB1	9	10	-
RB5	2	3	1
WS3	2	-	-
WS4	-	9	1
OR2	2	-	-
RB2	-	2	-
PS1	1	-	-

Conclusions: Some isolates showed antibacterial activity against Gram-positive and Gram-negative bacteria during preliminary testing. Further tests are needed to confirm these results. These findings can be used for further investigation to develop broad-spectrum antibiotics for therapeutic targets.

Keywords*: Actinomycetes, antibacterial activity, soil*

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