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## Antimicrobial Properties of Selected Plant Species in the Ussangoda and Yodhaganawa Serpentine.

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### Abstract

Serpentine are the soils derived from ‘serpentinised’ (altered by hydration) ultramaffic rocks. These are poor in plant-essential nutrients, organic matter, water availability, etc., but, rich in Mg, Fe, and heavy metals Ni, Cr and Co. Serpentine flora may be assisted by various bioactivities beneficial for mankind. This study aimed to investigate the antimicrobial properties of selected serpentine plant species from two serpentine sites in Sri Lanka: Ussangoda (in Hambantota District) and Yodhaganawa (inside Wasgomuwa National Park). Eleven (11) plant samples from 10 species were collected from the two serpentine sites for screening for antimicrobial activity against Gram positive (*Bacillus cereus*, *Staphylococcus aureus*) and Gram negative (*Escherichia coli*, *Pseudomonas aeruginosa*) bacteria, and fungi (*Aspergillus niger*, *Candida albicans*, *Trichoderma viridis*). Plant material of 04 species were collected from both the serpentine and the neighboring non-serpentine soils in Ussangoda, for comparative analysis of the effect of substrate on the antimicrobial activity of these plants. Crude extracts were obtained by soaking dried, powdered leaf material in 1:1 mixture of Methanol: Dichloromethane for two weeks and subsequent concentrating. Samples re-dissolved in 10% DMSO in methanol were used in the Kirby- Bauer Antibiotic Disc Diffusion Assay and Micro-Titre Plate Based Resazurin Assay. Data obtained from the assays were analyzed using SPSS 16.0 software. When screened, 10 extracts (*Azadirachta indica*, *Lantana camara*, *Toddalia asiatica*, *Eupatorium odoratum*, *Bauhinia racemosa*, *Carissa spinarum*, *Garcinia spicata*, *Atalantia monophylla*, *Tarenna asiatica*) showed activity against at least one test microorganism. The extract of *Tarenna asiatica* showed activity against all the test microorganisms. *Sapindus saponaria* extract did not show activity against any of the test organisms. When comparing, *Azadirachta indica* extract did not show any significant difference ( $P > 0.05$ ) in the mean diameter of the inhibition zone ( $\pm$ SD) between the serpentine site and the adjacent non-serpentine site for all the tested bacterial species. However, significantly higher ( $P < 0.05$ ) mean diameter of the inhibition zone ( $\pm$ SD) against *E. coli* was shown by the serpentine *Lantana camara* extract ( $13.3 \pm 1.1$ mm) compared with the non-serpentine plant extract (mean diameter of the inhibition zone  $9.5 \pm 0.9$ mm). In contrast, non-serpentine extract of *Eupatorium odoratum* showed slightly higher activity than that of the serpentine plant extract against the same bacterial strain, with respective mean diameters ( $\pm$ SD) of inhibition zones being  $10 \pm 0.9$  mm and  $8 \pm 0.8$  mm. The results indicate that serpentine flora may have altered antimicrobial activities compared to the plants of the same species growing in non-serpentine soils, probably due to the influence of the serpentine substrate.

**Keywords:** Serpentine, Ultramaffic, Plants, Bioactivities, Antimicrobial, Properties