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An Investigation of the Antibacterial Potential of Selected Local Medicinal Plants Belonging to the Fabaceae Family

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Background: Although antibiotics were thought to be the perfect solution to bacterial infections, the emergence of antibiotic resistance has become a global health issue. The identification of novel plant-based antibacterial drugs is a promising strategy to overcome the problem of antibiotic resistance. Even though, Sri Lanka makes it home to a variety of medicinal plants, most of these plants are unexplored for their antibacterial potential.

Objective: Therefore, the goal of our research is to screen for local medicinal plants with antibacterial activity and utilize that knowledge in novel therapeutic developments.

Methods: Plants belonging to Fabaceae family, *Cassia alata* (candle bush), *Psophocarpus tetragonolobus* (winged beans) and *Dendrolobium umbellatum* (horse bush) are selected for the initial phase of the study. Fresh, aqueous as well as methanol extracts of selected plant leaves were prepared. Standard phytochemical tests were performed to determine phytochemical profiles. Individual as well as synergistic antibacterial activities of leaf extracts against Gram-positive *Staphylococcus aureus* (ATCC 25923) and Gram-negative *Escherichia coli* bacteria (ATCC 25922) were tested using agar well diffusion method. For microbial inoculum, 0.5 MacFarland standardized bacteria were further diluted to obtain the bacteria concentration at 1×10^6 CFU mL⁻¹.

Results: According to our results selected plant species contain a variety of phytochemicals such as tannins, saponins, alkaloids, flavonoids, terpenoids, etc. In antibacterial studies with individual plant extracts, it was found that methanol extracts of candle bush (Zone of Inhibition (ZI) – 15.0 (±1.7) mm) and horse bush (12.0 (±1.0) mm) leaf extracts inhibit *S. aureus*. In synergistic studies, all combinations showed inhibition of *S. aureus* whereas none of the extracts showed inhibition of *E. coli*. This might be due to the presence of a harder cell wall structure in *E. coli* compared to *S. aureus*.

Conclusion: Interestingly, from our initial results we can conclude that selected Fabaceae plants exhibit a potent phytochemical profile and promising antibacterial potential. This study would be a steppingstone to evaluate the synergistic combinations of plant extracts of Fabaceae family, and their efficiency against bacterial infections.

Keywords: Phytochemicals, Antibiotics, Fabaceae