



## Screening *In vitro* Antimicrobial Activity and Green Synthesis of Silver Nanoparticles from the Selected Crude Extractions of the Sri Lankan Medicinal Plant '*Vernonia zeylanica*'

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### Abstract

Traditional herbalists and communities have employed the genus *Vernonia* extensively to treat a variety of infections. *Vernonia zeylanica* is an endemic plant in Sri Lanka with remarkable bioactivities. The present study aims to determine the antimicrobial activity of the plant *Vernonia zeylanica* in selected solvent series and to synthesize biocompatible silver nanoparticles from them. This will provide insight into the product development which can be commercialized as a hale, cost-effective, and environmentally friendly antimicrobial agent in the field of ethnomedicine. Agar well diffusion and disc diffusion methods have been used for 40000 ppm concentrated solvent series in ascending order of polarities such as hexane, ethyl acetate, methanol, and water to investigate the bactericidal and fungicidal activity. According to the visual observation and the statistical analysis of variance -One way ANOVA followed by Tukey's test ( $\alpha = 0.05$ ); Ethyl acetate crude extract has shown the highest growth inhibitory activity against pathogenic bacteria *Bacillus cereus* (15.23mm $\pm$  3.03), *Staphylococcus aureus* (13.33mm  $\pm$  1.35) and *Pseudomonas aeruginosa* (11.03mm  $\pm$  0.57) and hexane crude extract for *Bacillus cereus* (12.90mm  $\pm$  2.71), *Staphylococcus aureus* (10.57mm  $\pm$  1.40) and *Pseudomonas aeruginosa* (13.57mm  $\pm$  1.91). The best antifungal activity has been revealed by methanol crude extract against pathogenic *Cladosporium cladosporioides* and *Aspergillus sp.* Silver Nanoparticles synthesized using ethyl acetate crude extract and characterized by UV-Visible spectroscopy showed the nanoparticle peak at 450nm. From the study, it is evident that the *Vernonia zeylanica* different crude extractions possess potential antimicrobial activity and further study may lead to comparing the effectiveness of nanoparticle activity against crude extract.

Keywords: *Antimicrobial, Green synthesis, Nanoparticles, Vernonia Zeylanica.*

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