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Antibacterial Activity of *Senna alata* (Gelenggang) Leaf Extract Against Pathogenic Bacteria

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Structured Abstract

Background: Gram-negative and Gram-positive pathogens cause various illnesses, including skin infections, typhoid fever, and intestinal pain. These bacteria have developed various mechanisms to invade their hosts and evade the host's immune system. Antibiotics have historically been effective in treating bacterial infections, but the rise of antibiotic-resistant bacteria has reduced their effectiveness. *Senna alata*, an herbal plant used for centuries to treat skin-related diseases and wounds, was used in a study to assess the antibacterial activity and efficacy of ethanolic extracts from *S. alata* leaves. These extracts are generally recognized as safe by the FDA and are believed to have antibacterial properties against various pathogenic bacteria.

Methods: The dried *S. alata* leaf powder was extracted using the cold maceration method, which involved soaking the powdered leaves in an ethanol-polar solvent. The antibacterial activity of the leaf extract against tested pathogens was determined using well diffusion and disc diffusion assays, and their efficiency was evaluated using minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) assays.

Results: The present study found that Gram-positive bacteria are more susceptible to the ethanolic *S. alata* leaf extract than Gram-negative bacteria. The inhibition zone sizes for both types of bacteria ranged from 11.3±0.6 mm to 22.0±0 mm, while the well diffusion assay showed a range of 8.0±0 mm to 14.0±0 mm. The antibacterial activity of the ethanolic leaf extract showed significant differences ($p < 0.05$) against tested bacteria, as indicated by different superscript letters. The extracts showed the same MIC and MBC values against all tested bacteria, with a ratio of MBC/MIC less than 4, indicating bactericidal activity.

Conclusion: In conclusion, the ethanolic *S. alata* leaf extracts possess antibacterial activity and may contribute to antibacterial efficacy, especially against Gram-positive bacteria.

Keywords: Antibacterial activity, antibiotic-resistant bacteria, *Senna alata*, ethanolic extract, pathogenic bacteria

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