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Phytochemical Analysis and Antibacterial Properties of Cat's Whiskers (*Orthosiphon stamineus*)

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Structured Abstract

Background: For millennia, people in Southeast Asia have used *Orthosiphon stamineus*, a unique medicinal herb commonly referred to as cat's whiskers or Java tea. It is widely known for its excellent properties, such as its anti-inflammatory and antioxidant properties against kidney stones, liver dysfunction and gout. However, prior studies have shown differences in utilising which components of *O. stamineus*, especially leaves, for their studies. This study aims to identify the phytochemical constituents and evaluate the antibacterial activity in different parts of *O. stamineus*.

Methods: Fresh *O. stamineus* plants were obtained and extracted with ethanol, which was then phytochemically screened on each component of the plant (whole plant, leaf, and stem). Further on, the disc diffusion technique and Minimum Inhibitory Concentration (MIC) were used to examine the antibacterial effectiveness against four strains of bacteria (both Gram-positive and Gram-negative), which were *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus cereus*, and *Staphylococcus aureus*. Minimum Bactericidal Concentration (MBC) was also determined for each part of the *O. stamineus* extracts.

Results: All extracts contain major phytochemical groups, flavonoids, alkaloids, saponin, and phenol compounds at different concentrations in phytochemical screening. For antibacterial activity, all extracts showed potential antibacterial properties against all bacterial strains except *E. coli*. The best antimicrobial activity was shown by the stem ethanolic extract of *O. stamineus* against *S. aureus and P. aeruginosa*, with an inhibition zone of 10.0 mm and MIC values of 15 mg/mL and 7.5 mg/mL, respectively. However, the MBC suggested it should be higher than 15 mg/mL to potentially kill all bacteria. Based on the One-way ANOVA test, there were no significant differences between all three extracts as $P>0.05$.

Conclusion: The extracts from *O. stamineus* showed antibacterial activity against common pathogens except *E. coli*. The lowest MIC was 3.75 mg/mL, and the MBC was above 15 mg/mL. This research provides a foundation for further studies on the antibacterial potential of *O. stamineus*.

Keywords: Antibacterial properties, *Orthosiphon stamineus*, Phytochemicals, Antibacterial activity

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