Determination of Phytochemical, Antioxidant and Antibacterial Potential of Selected Leafy Spices in Sri Lanka

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In Sri Lankan culture, leafy spices are valued for their culinary and therapeutic benefits, including flavor enhancement, color, and food preservation. While bioactive compounds from these spices have been studied individually, comparative research is lacking. This study aims to compare the phytochemical composition, total phenol and flavonoid content, and antioxidant and antibacterial activities of four commonly used leafy spices in dry powder form :*Murraya koenigii*, (Curry leaves*), Pandanus amaryllifolius* (Pandan), *Cymbopogon citrates* (Lemongrass), *Mentha Piperita* (Mint) .The total phenolic content (TPC) was quantified using the Folin-Ciocalteu method, total flavonoid content (TFC) was assessed through the Aluminum chloride colorimetric assay, in vitro antioxidant capacity was evaluated via the DPPH radical scavenging assay and the phytochemical composition was qualitatively analyzed. The evaluation of antibacterial activity was conducted against three bacterial strains, *Escherichia coli* (ATCC 11229), *Staphylococcus aureus* (ATCC 6538), and *Pseudomonas aeruginosa* (ATCC 15442), utilizing minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) tests. *Murraya koenigii*, the variety with the highest phenolic content (335.13 ± 0.13 mgGAE/g) *and* the highest flavonoid content (25.05 ± 0.10 mg RE/g), also demonstrated the highest DPPH radical scavenging activity (87.26%± 0.15, indicating a significant correlation between these compounds and antioxidant properties. Additionally, this variety recorded the lowest MIC and MBC values, suggesting that higher phenolic and flavonoid content is linked to enhanced antimicrobial effectiveness. These findings highlight the important relationship between the bioactive compound content and the overall bioactivity of *Murraya koenigii* compared to other varieties. Qualitative phytochemical analysis revealed that all four varieties are rich in phytochemicals. *Murraya koenigii*, was tested negative for saponins, Mentha *piperita* and *Pandanus amaryllifolius* were negative for steroids. The study indicated that *Murraya koenigii* possessed a significantly high TPC, TFC, higher antibacterial and antioxidant activity than other three leafy spices investigated. Further analysis conducted using with other available varieties can give a clearer image on the bioactive potential of the selected leafy spices.

Keywords: Antimicrobial Properties, *Murraya Koenigii*, Phytochemical Composition, Total Phenol Content, Total Flavonoid Content