

Phytochemical Profiling of *Cymbopogon citratus* and *Cymbopogon nardus* Through Gas-Chromatography Mass Spectrometry (GC-MS)

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Structured Abstract

Background: *Cymbopogon citratus* (lemongrass) and *Cymbopogon nardus* (citronella) are aromatic grasses widely used in culinary, therapeutic, and commercial applications. Despite their similar appearances and scent profiles, their compositions may differ significantly. The stalks of *C. citratus* are commonly used in cooking, while its leaves are often discarded. On the other hand, *C. nardus* is used as an essential oil in the insect repellent products. Due to their similarities, these species often misidentified and used interchangeably, which may compromise the efficacy of the products. This study aims to extract and analyze the essential oils from leaves and stalks of both species to uncover their bioactive compositions.

Methods: The essential oils from leaves and stalks of *C. citratus* and *C. nardus* were extracted through steam distillation. The produced oils undergo Gas Chromatography-Mass Spectrometry (GC-MS) analysis to identify the volatile phytochemicals. The compounds were identified through comparing of their spectral data with those recorded within defined chemical libraries like NIST. Extractive efficiency was also determined by calculating percentage yield on each part of the plant.

Results: The GC-MS profiling showed differentiated chemicals present in both species and plant parts. *C. citratus* stalks were particularly rich in citral, supporting their culinary use, while *C. nardus* showed a higher concentration in geraniol and citronellal, highlighting its insect-repellent potential. The leaves and stalks of *C. citratus* primarily had monoterpenoid aldehydes, 69.73% and 87.01% respectively, whereas *C. nardus* leaves and stalks were dominated by monoterpenoid alcohols with 39.32% and 33.66% respectively. These findings validate that both of these species have different phytochemical compositions with distinct bioactive properties.

Conclusion: In conclusion, this study highlights the chemical diversity and potential value of both leaves and stalks in *C. citratus* and *C. nardus*. By presenting a detailed comparison, the results justify the more extensive use of plant parts that are normally discarded and reduce the risk of mistaken identification. The GC-MS method was effective in separating the species and this encourage more informed and specific utilization of these valuable aromatic grasses.

Keywords: *Cymbopogon citratus*, *Cymbopogon nardus*, Essential oil, Steam distillation, GC-MS

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