

Comparative Volatile Profile of Pomelo (*Citrus Grandis*) and Grapefruit (*Citrus paradisi*) Peels Essential Oils

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Structured Abstract

Background: Pomelo (*Citrus grandis*) and grapefruit (*Citrus paradisi*) are closely related citrus fruits cultivated for their aromatic peels, rich in essential oils. Pomelo is well known, yet few studies have thoroughly analyzed the detailed chemical composition of its peel essential oil, especially compared to grapefruit. The composition of essential oils can differ due to species, geographical areas, and extraction methods. Grapefruit essential oil has been more extensively researched, but comparative studies using solvent extraction between these two fruits remain limited. This study aims to investigate and compare the volatile profiles of peel essential oils extracted using solvent extraction techniques.

Methods: About 30 g of fresh *C. grandis* zest and 60 g of *C. paradisi* zest were obtained by finely grating the fruit peels. Each zest sample was placed in two separate Duran Schott bottles with hexane solvent and shaken vigorously. The mixture was filtered using filter paper and anhydrous sodium sulfate to remove any excess water. This extraction process was repeated three times. The final extracts were concentrated using a rotary evaporator. The extracted oils were weighed and stored for subsequent GC-MS analysis.

Results: The peels from both species were successfully extracted from solvent (hexane) extraction. GC-MS analysis revealed that both oils contain major monoterpenes such as limonene, with *C. paradisi* showing a higher percentage of the limonene compared to *C. grandis*. *C. grandis* contained higher oxygenated sesquiterpenes and fatty acids. Oxygenated monoterpenes were also more prominent in *C. paradisi*. The unique composition of each oil indicates species-specific bioactive compounds that could influence their potential applications.

Conclusion: This comparative profiling shows significant chemical constituents' differences between *C. grandis* and *C. paradisi* essential oils. Understanding these differences can support the development of targeted applications in cosmetics, pharmaceuticals, and aromatherapy. Future studies should further examine the bioactivities of these compounds and validate them through biological assays.

Keywords: *Citrus grandis*, *Citrus paradisi*, solvent extraction, essential oils, GC-MS

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