

PUBLICATIONS

GC–MS–BASED CHARACTERIZATION OF THE VOLATILE PHYTOCHEMICAL PROFILE OF A COMBINED DRY EXTRACT OF *Acorus calamus*, *Helichrysum maracandicum* AND *Aerva lanata*

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Despite the increasing use of synthetic medicines, herbal preparations remain an important component of modern healthcare. The quality, safety, and chemical composition of multicomponent herbal preparations require comprehensive characterization to ensure their standardization and safe application. Nefrolan is a combined dry extract obtained from *Acorus calamus*, *Helichrysum maracandicum*, and *Aerva lanata* and is intended for use in the management of kidney-related disorders. However, comprehensive information on its volatile phytochemical composition is limited.

The aim of this study was to characterize the volatile constituents of the combined dry extract Nefrolan by gas chromatography–mass spectrometry (GC–MS) and to identify the major components that may contribute to its pharmacological properties.

The volatile constituents of the combined dry extract were analyzed by GC–MS. Compound identification was performed by comparison of the obtained mass spectra with reference spectra from the Wiley Registry of Mass Spectral Data, 9th Edition, and the NIST Mass Spectral Library. The relative content of each identified compound was calculated from its chromatographic peak area and expressed as a percentage of the total peak area.

A total of 118 chromatographic peaks were detected, and several major volatile constituents were identified. The predominant compounds included cyclofenchene (16.37%), α -terpineol (15.46%), endo-borneol (8.81%), eucalyptol (6.60%), β -asarone (2.84%), (–)- β -pinene (2.73%), α -asarone (1.81%), and γ -terpinene (1.32%). The detection of monoterpenes, oxygenated monoterpenes, and phenylpropanoid derivatives indicates the chemically diverse nature of the volatile fraction of Nefrolan.

For the first time, the volatile phytochemical profile of the combined dry extract Nefrolan was characterized by GC–MS, providing a comprehensive qualitative and quantitative profile of its volatile constituents. Particular attention was given to β -asarone, a compound whose content is subject to regulatory restrictions because of its reported toxicological properties. The obtained data may be used for the chemical standardization and quality control of Nefrolan.

GC–MS analysis demonstrated that Nefrolan contains a complex mixture of volatile phytochemicals, including cyclofenchene, α -terpineol, endo-borneol, eucalyptol, β -asarone, and other terpenoid and phenylpropanoid constituents. The established volatile profile provides a chemical basis for the standardization of the combined dry extract and indicates the need for further studies of its pharmacological activity and safety.