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## INTEGRATED CHEMICAL AND BIOLOGICAL ASSESSMENT OF *RHODODENDRON TOMENTOSUM* HARMAJA EXTRACTS

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**Introduction:** Medicinal plants are valuable sources of biologically active compounds widely used in pharmaceutical and cosmetic formulations. *Rhododendron tomentosum* Harmaja is known for its rich phytochemical composition, including essential oils, phenolic compounds, and other secondary metabolites with potential biological activity.

**Aim:** The aim of this study was to perform an integrated chemical and biological assessment of *R. tomentosum* extracts and to evaluate the influence of extraction solvents on the yield of bioactive compounds and their biological activity.

**Methods:** Plant material of *R. tomentosum* was collected in Ukraine. The phytochemical composition of the obtained extracts was investigated using GC–MS, HPLC–PDA and UV–Vis spectrophotometric methods.

**Results:** The results showed that *R. tomentosum* raw material contained  $\gamma$ -terpineol (23.9%), palustrol (17.2%), ledol (14.9%), and p-cymene (5.2%) as the dominant constituents of the essential oil. The non-volatile fraction was rich in triterpene acids, particularly ursolic acid. In addition, the extracts contained chlorogenic acid ( $1.63 \pm 0.18$  mg/g) and neochlorogenic acid ( $1.17 \pm 0.13$  mg/g). The studied extracts demonstrated antioxidant activity and inhibited cathepsin C *in vitro*.

**Conclusions:** This study provides a comprehensive analysis of the volatile and non-volatile chemical composition and the cathepsin C inhibition of *Rhododendron tomentosum* Harmaja highlighting its potential as a source of biologically active compounds.

## COMPARISON OF MULTI-CRITERIA OPTIMIZATION METHODS IN PHARMACEUTICAL DEVELOPMENT

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**Introduction.** Multi-criteria optimization is a key tool in pharmaceutical development. It is used to optimize technological processes, predict pharmacokinetics and pharmacodynamics, ensure stability and bioavailability of dosage forms, and comply with safety, quality, and regulatory requirements. It reconciles multiple, often conflicting criteria, supporting informed decision-making in drug development. This approach is particularly important for determining the composition and manufacturing technology of pharmaceutical products. It enables quantitative identification of