UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA
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PHYTOCHEMICAL CHARACTERIZATION OF THE ETHANOLIC EXTRACT OF *MARCHANTIA POLYMORPHA* BY GC–MS

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Abstract: *Marchantia polymorpha L. is a liverwort of phytochemical interest due to its diverse secondary metabolites. This study characterized the chemical composition of its ethanolic extract using gas chromatography–mass spectrometry (GC–MS). Plant material was macerated in 90% ethanol for 72 h at room temperature. The analysis tentatively identified constituents belonging to several chemical classes, including diterpenes and polycyclic derivatives, sesquiterpenes, monoterpenes, aliphatic derivatives, sulfur-containing heterocycles, and steroid-related compounds. The profile highlighted the contribution of terpenoids to the extract's chemical diversity. These findings provide a basis for further research to confirm constituent identities, isolate selected compounds, and experimentally evaluate their biological properties.*

Introduction

Marchantia polymorpha L. contains diverse terpenoids, phenolic compounds and bisbibenzyls (Asakawa et al., 2013). Its distribution in Romania motivates phytochemical investigation. This study examined the chemical composition of its ethanolic extract using GC–MS



Fig.1 Marchantia polymorpha and the reproductive structures and gemma cups.

Material and method

Cleaned plant material was dried at 35–40 °C, ground, and macerated in 90% ethanol at a plant material-to-solvent ratio of 1:10 (w/v) for 72 h at room temperature with continuous agitation. The extract was filtered, concentrated under a nitrogen stream, and redissolved in DMSO.

GC–MS analysis**.** The extract was analysed using an HP 6890 gas chromatograph coupled to an HP 5973 mass selective detector and equipped with a DB-WAX column. Constituents were tentatively identified by comparison with the NIST mass spectral library. Relative abundances were expressed as percentages of integrated chromatographic peak areas.



Fig. 2. Extract preparation: A, maceration; B, extract samples; C, filtration; D, concentration apparatus.

Results and discussions

GC–MS yielded 33 tentative compound assignments. Diterpenes and polycyclic derivatives formed the largest class (32.89%). Sesquiterpene hydrocarbons and oxygenated sesquiterpenes together accounted for 23.80% of relative peak area. The strongest chromatographic signals occurred at approximately 45–47 min**.**

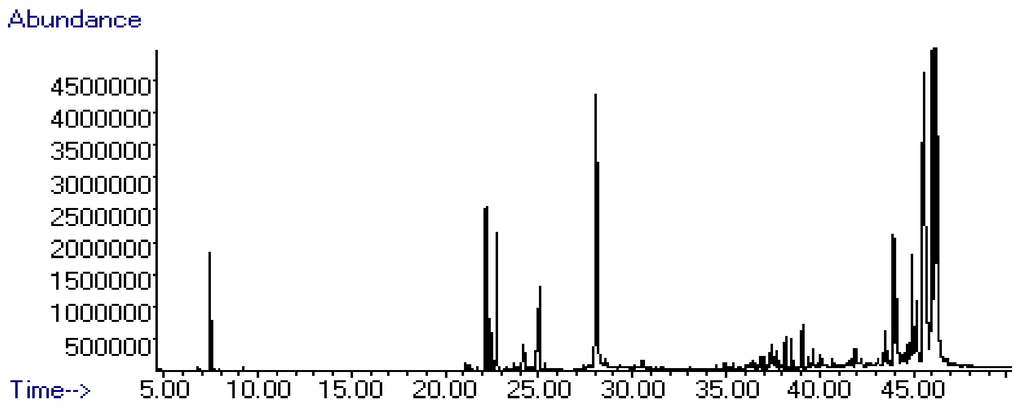


Fig. 3. GC–MS chromatogram of the ethanolic extract of M. polymorpha. Source: Pricop (2026).

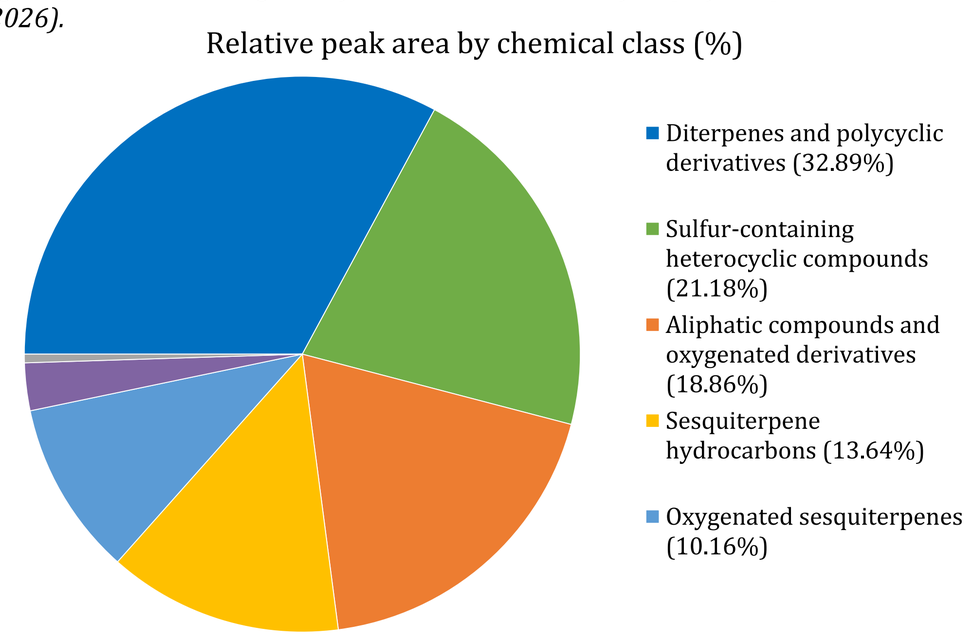


Fig. 4. Chemical-class distribution, expressed as relative chromatographic peak area (%). Data: article Table 3.

Conclusions

GC-MS profiling revealed a chemically diverse extract dominated by diterpenes and polycyclic derivatives. These findings provide a basis for further phytochemical investigation, including the isolation and structural characterization of selected compounds. Confirmation of compound identities and biological testing are required to assess the extract's potential applications.

Selected references

Asakawa, Y., Ludwiczuk, A., Nagashima, F. (2013). Chemical Constituents of Bryophytes. Springer.

Pricop, E. D. (2026). Caracterizarea fitochimică a extractului etanolic de Marchantia polymorpha prin GC–MS. Bachelor's thesis, ULST Timișoara.