

Ukraine ethnoveterinary phytomedicine research in MedPlants4Vet

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COST Action MedPlants4Vet

Despite growing demand for natural animal healthcare driven by antimicrobial resistance and the European Green Deal, few registered **herbal veterinary medicinal products (HVMPs)** currently exist due to incomplete EU regulations and a lack of accessible information. The MedPlants4Vet initiative (www.MedPlants4Vet.eu) aims to bridge this gap. It is a COST Action collaboration between **38 European members and associated countries**, which aims to bring together traditional herbal veterinary knowledge on a platform that is utilizable by all interested parties.



The Laboratory of Adaptational Biotechnology

The Laboratory of Adaptational Biotechnology is a part of the Institute of Cell Biology and Genetic Engineering of the National Academy of Sciences of Ukraine. The research areas include: **study of the bioactivity of medicinal plants**; use of hairy roots of medicinal plants as biofactories for the synthesis of valuable compounds with a wide range of activities (**antioxidant, antiradical, anti-inflammatory, antiviral, antimicrobial**); genetic transformation of plants of various species for the production of bioactive compounds; development of an **effective technology** for the green synthesis of metal nanoparticles; development of approaches for the use of plants of various species in the **phytoremediation** process; use of the in vitro collection of bryophytes for a wide range of research. The laboratory has a **unique collection of hairy root cultures**, which includes more than 80 lines from 16 species of medicinal plants. Each line has a unique phytochemical profile and can be used for the **development of biopharmaceuticals for the needs of veterinary and human treatment**.



Aim

Research on the traditional use of herbal products in veterinary medicine is one of the aims of the MedPlants4Vet international project – Medicinal plants for animal health care. Ukraine is one of the countries-members of this project since 2024. The aim of the research on the **ethnoveterinary practices of Ukraine** is to compile a list of plants used on the territory of Ukraine for centuries and still used today. Within the framework of the project, information on the Legal status of HVMPs, current registered HVMPs, and some ethnoveterinary uses was provided for Ukraine. For this 74th International Congress and Annual Meeting of the Society for Medicinal Plant and Natural Product Research, information on the bioactivity of some plants from the compiled list that are the focus of research in the Laboratory of Adaptational Biotechnology is also provided. Thus, some of the findings provided through the MedPlants4Vet project are supported by the previous works of the authors.

Materials and methods

The methodology of the work included the use of **national and online libraries** in Ukraine. The following criteria were studied: plant name, part used, extraction method, route of administration, animal species, and treatment intention. For the finding of current registered HVMPs, the **official online database** of Ukraine was used: State Service of Ukraine for Food Safety and Consumer Protection (<https://dpss.gov.ua/diyalnist/bezpechnist-harchovih-produktiv-ta-veterinarna-medicina/reystri>). For the legislative part, the **official legislation database** (<https://zakon.rada.gov.ua/laws>) and the website of the national competent authority (<https://www.kmu.gov.ua/>) were used. Some of the findings on the **bioactivity of the provided plants were previously reported by the authors** in the Laboratory using standard methods for determining flavonoid content and antioxidant activity, and are used to support the project's findings.

Results and Discussion

Legal status of HVMPs in Ukraine

The laws on human and veterinary medicine in Ukraine are separate. The main law regarding veterinary medicine in Ukraine is **THE LAW OF UKRAINE On Veterinary Medicine**, Document 1206-IX, in force. – ЗАКОН УКРАЇНИ Про ветеринарну медицину, Документ 1206-IX, чинний. The first Edition of THE LAW OF UKRAINE On Veterinary Medicine was published on 25.06.1992 (Document 2498-XII), less than a year after the reestablishment of Ukraine's state independence. On 16th of December 2025, Ukraine has implemented the norms for full harmonization of Ukrainian law with EU 2019/6, 2016/429, and 2017/625.

Current registered HVMPs in Ukraine

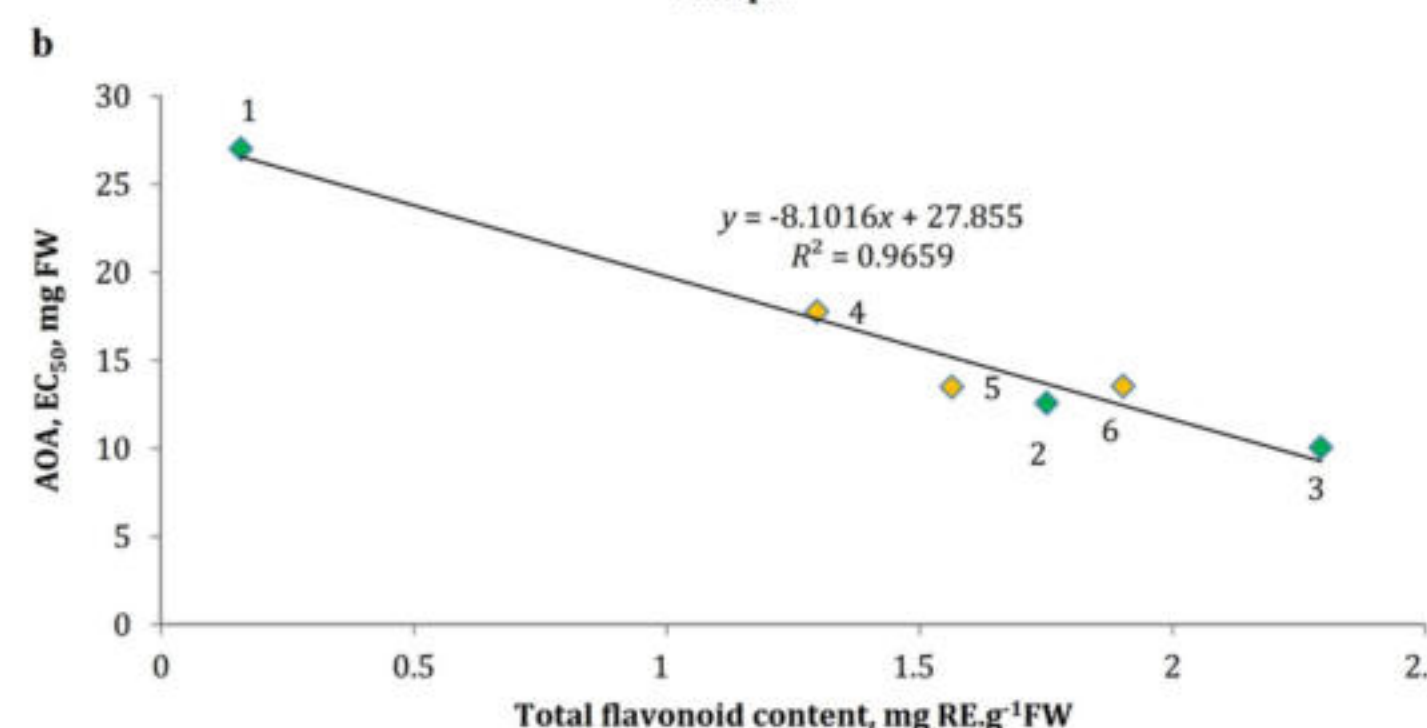
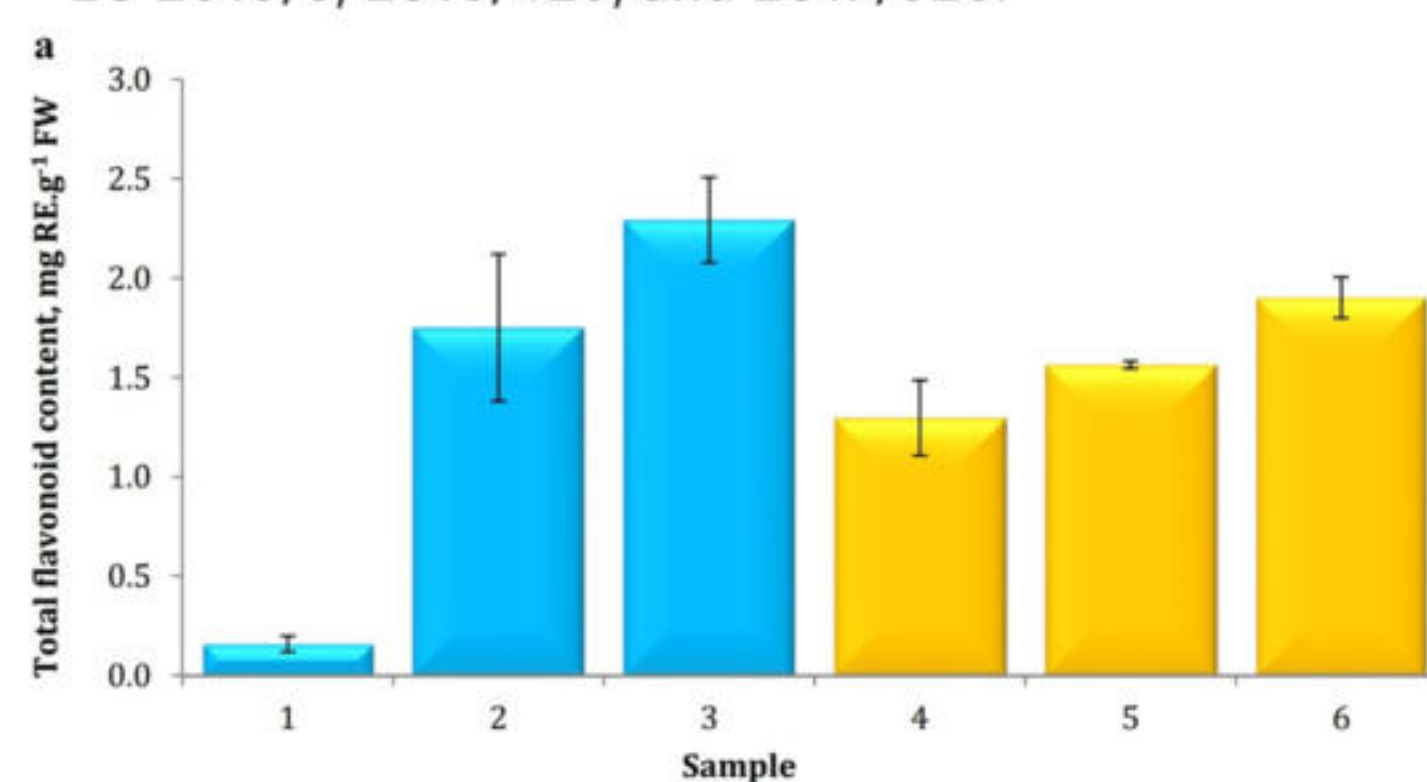
According to the State Service of Ukraine for Food Safety and Consumer Protection, **there are several HVMPs that are currently registered**. Namely, JOCKEY GEL, Forticept™ Blue Butter Gel, Otoderm, FITOSEPT, AURIKAP, OPHTHALMOVET, UROLIC, Phytokit, ZOOHEALTH RECTAL SUPPOSITORS, DIVOPRIDE RECTAL SUPPOSITORS, ANTI-STRESS valeriana, Apihealth, and PROFILINE KEEP CALM have herbal products (dried plant material, extracts, fatty oils) in the content of current herbal veterinary medicinal products of Ukraine.

List of plants for ethnoveterinary use

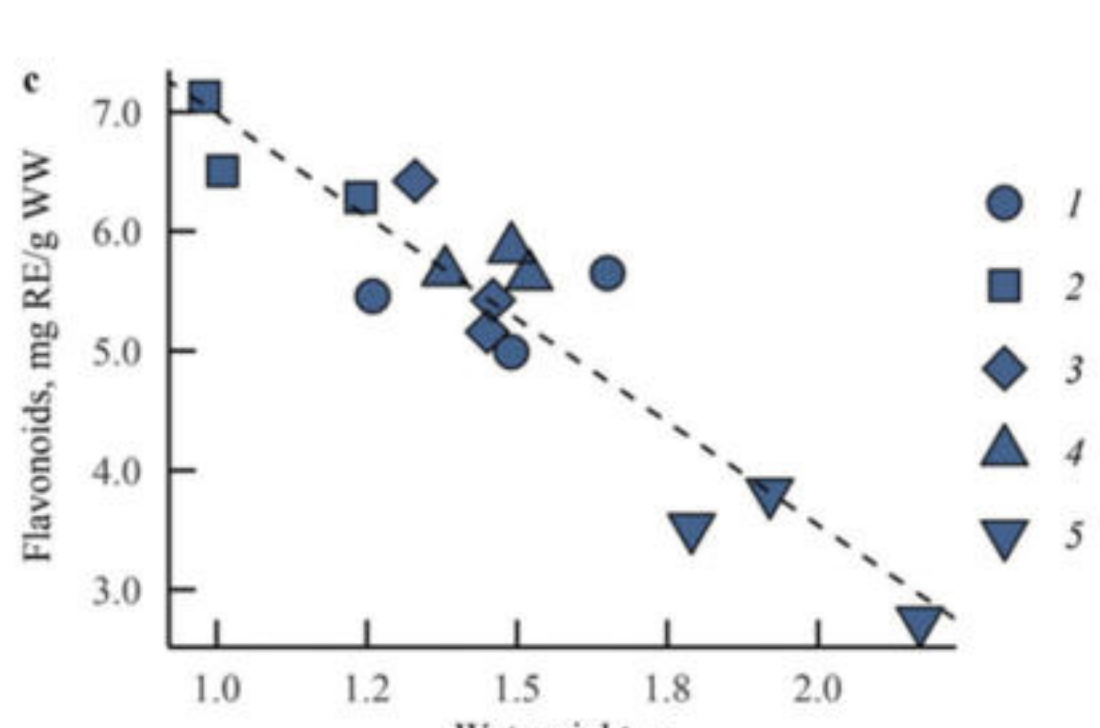
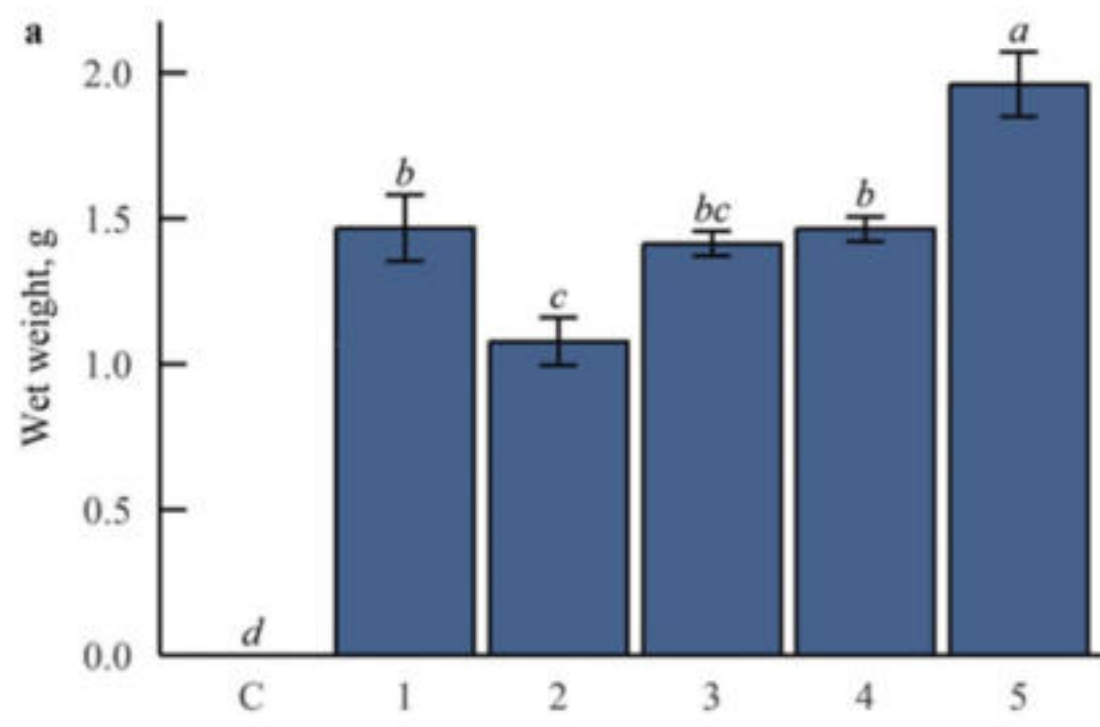
More than 70 plants were identified as ethnoveterinary remedies, among which the most frequently used were *Achillea millefolium* L., *Allium cepa* L., *Allium sativum* L., *Althaea officinalis* L., *Artemisia absinthium* L., *Atropa bella-donna* L., *Calendula officinalis* L., *Cotinus coggygria* Scop., *Equisetum arvense* L., *Hippophae rhamnoides* L., *Hypericum perforatum* L., *Matricaria chamomilla* L., *Mentha x piperita* L., *Origanum vulgare* L., *Plantago major* L., *Potentilla erecta* (L.) Raeusch., *Quercus robur* L., *Sorbus aucuparia* L., *Taraxacum* sect. *Taraxacum* F.H.Wigg., *Thymus vulgaris* L., *Urtica dioica* L., *Valeriana officinalis* L., and *Zea mays* L. **The most common plant families were:** Asteraceae – 5, Lamiaceae – 3, Amaryllidaceae – 2, Rosaceae – 2.

Support of the findings

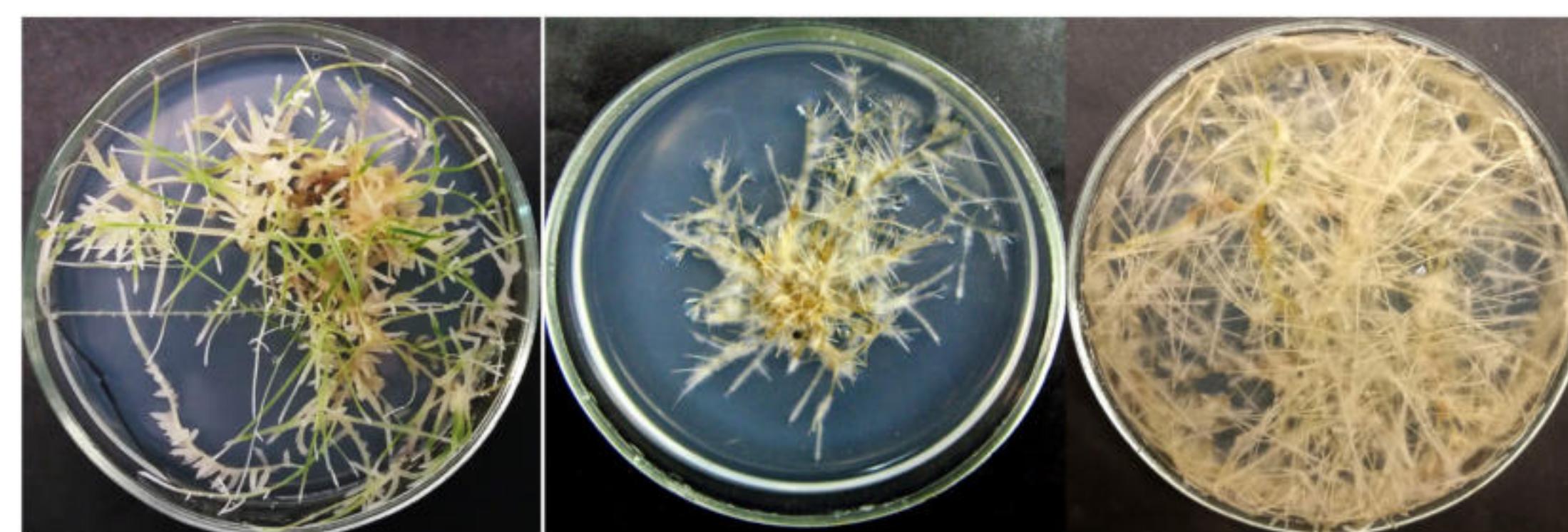
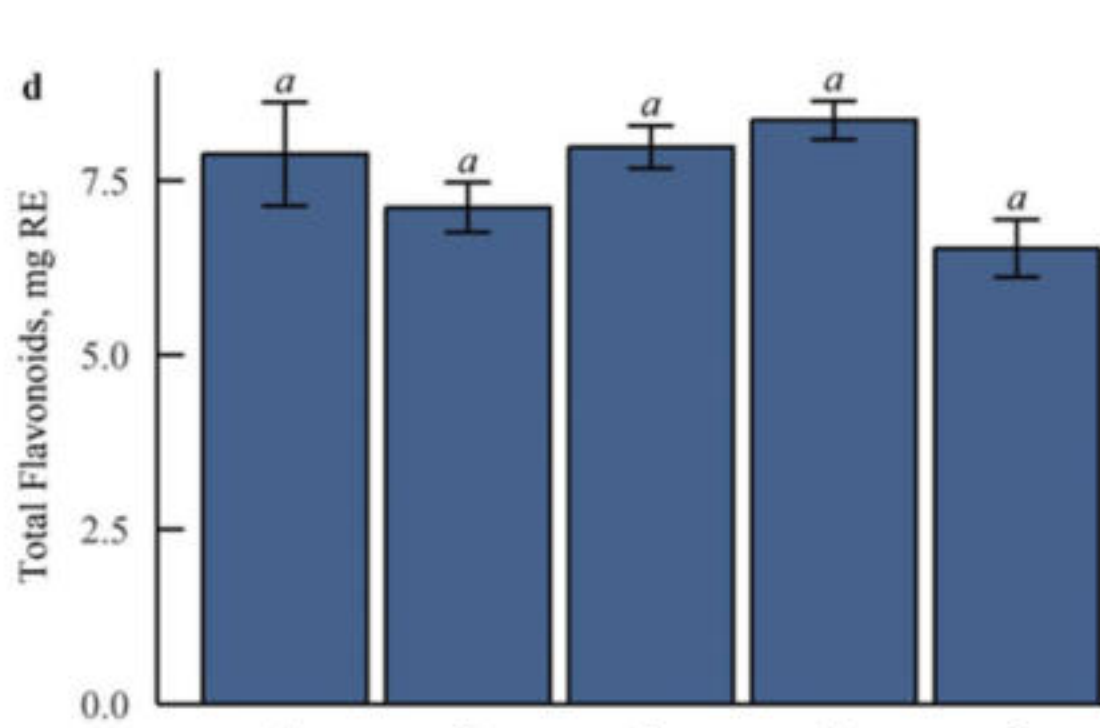
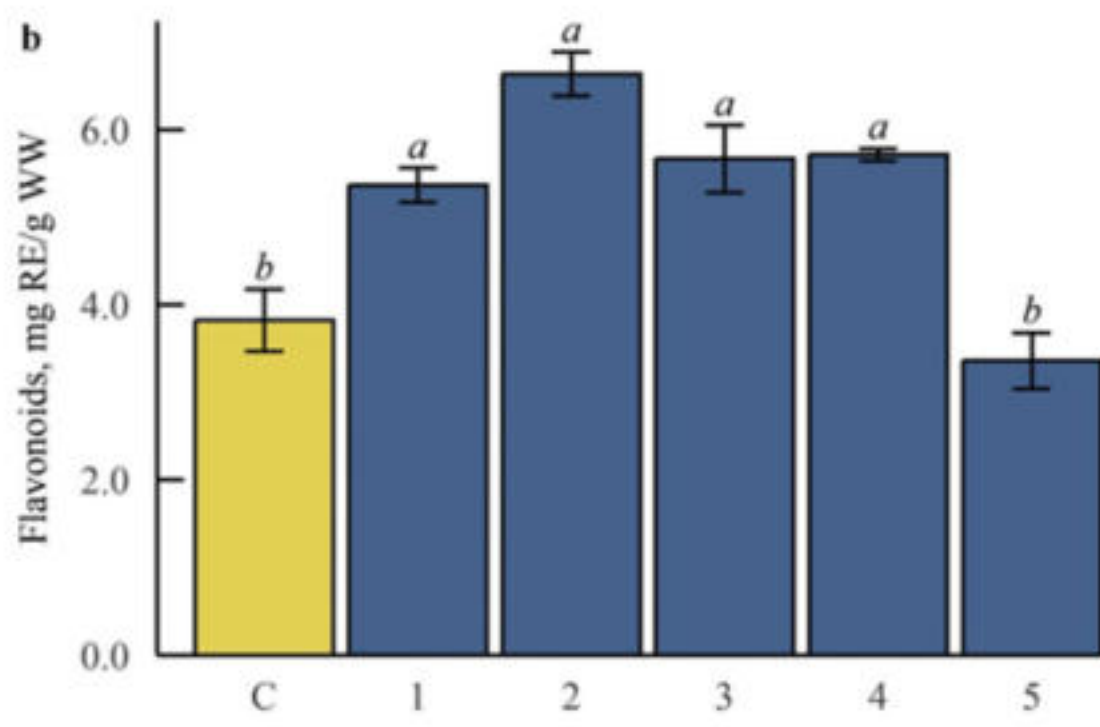
In our Institution, the **bioactivity of some plants** from the above-mentioned list and hairy root cultures derived from them, namely *Althaea officinalis*, *Artemisia absinthium*, and *Calendula officinalis* was studied. In particular, *A. officinalis* and *C. officinalis* hairy roots were characterized by high content of flavonoids (up to 2.29 ± 0.21 mg RE/g FW and 6.68 ± 0.28 mg RE/g FW, respectively) and high antioxidant activity ($EC_{50} = 10.06$ mg FW and $EC_{50} = 6.91 \pm 0.35$ mg FW, respectively) [1, 2]. Evaluation of free radical scavenging activity in *A. absinthium* showed that the highest antioxidant activity was demonstrated by the extracts from the hairy roots No. 3 ($EC_{50} = 3.66$ mg) [3]. This activity was 1.8 and 3.6 times higher than that of the root and leaf extracts from control plants ($EC_{50} = 6.72$ and 13.23 mg, respectively).



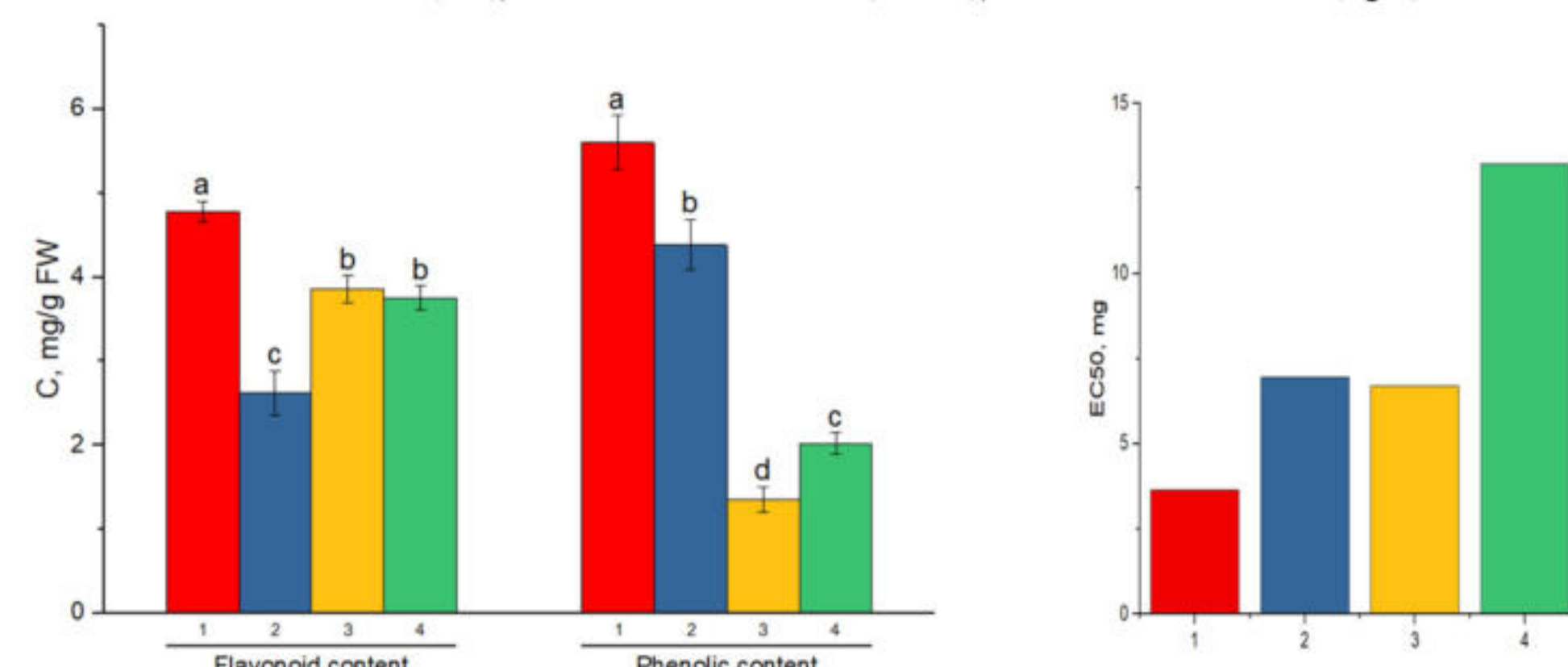
The total content of flavonoids (a) and correlation between the total flavonoid content and DPPH scavenging activity (AOA, b) in *Althaea officinalis* L. hairy root lines. Lines 1–3 were transformed with *Agrobacterium rhizogenes* A4 wild strain; lines 4–6 were transformed with *A. rhizogenes* strain carrying human interferon- $\alpha 2b$ target gene [1].



Weight gain of *Calendula officinalis* hairy root lines on half-strength MS medium (a), the content of flavonoids after extraction with 70% ethanol (b), linear regression (c), total flavonoid content (d); c – roots of the control plants, 1–5 – hairy root lines [2].



Althaea officinalis L. (left), *Artemisia absinthium* L. (center), *Calendula officinalis* L. (right)



Total flavonoids, phenolic content, and antioxidant activity (EC_{50}) in ethanol extracts of transgenic roots No3 (1) and No4 (2), and roots (3) and leaves (4) of control plants of *Artemisia absinthium*. * $P < 0.05$

Conclusions

Overall, the findings demonstrate that **Ukraine possesses a strong ethnoveterinary tradition, a supportive legal framework, and scientifically validated plant bioactivities**. This combination underscores both the importance and feasibility of integrating herbal remedies into contemporary veterinary medicine, while preserving traditional knowledge and ensuring the sustainability of animal health care. Thus, traditional medicinal plants remain central to veterinary practice in Ukraine, providing both historical continuity and modern applications through their bioactive and functional properties.

Acknowledgements

The work was partially conducted in the framework of COST Action CA22109 MedPlants4Vet – Medicinal plants for animal health care: Translating tradition into modern veterinary medicine. The Action is supported by COST (European Cooperation in Science and Technology). The authors would like to thank the action chair and main coordinator of the project, Dr Theresa Schlittenlacher, as well as the Working Group leaders and the community of MedPlants4Vet. The presenting author expresses gratitude for the opportunity to present the findings at GA Reims, thanks to the YRICG, awarded within the framework of this COST Action.

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