Nederlandse vereniging Fytotherapie

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Olha Mykhailenko

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The Tetranational Congress Phytotherapy

30 – 31 May 2024

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Why do we still need information from folk medicine?

Tinde van Andel

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Introduction

The rationale for ethnopharmacological fieldwork is often sought in the discovery of new medicinal plant species in tropical rainforests. The quest focuses on finding new phytochemicals and/or developing new natural products to combat diseases for which we have no cure yet. The 'we' in this argument often means Western people and the health problems meant here are often 'welfare diseases' such as high blood pressure, diabetes, obesity, cardiovascular problems and bacteria that have become resistant to antibiotics. Should the rainforest be protected for people in rich countries to combat their ailments?

Very little attention is paid to the millions of people worldwide who use medicinal plants on a daily basis. Most herbal medicine is used to combat health issues caused by poverty, such as malnutrition, anemia in pregnant women and tropical infectious diseases. Moreover, many pharmacologically active plant species are used for rituals. While many scientists have argued that these 'magic' plants do not have any pharmacological relevance, the majority are applied in a way that they come in direct contact with the human body. What physical effect can these plants have on human health?

Methods

In this presentation, based on data collected during 15 years of ethnobotanical fieldwork, I explain the need to focus on ethnopharmacology research to combat 'poverty diseases' with medicinal plants. Which plant species could help to combat malnutrition? How can we ensure the health of those people who cannot afford Western medicine and only rely on medicinal plants? Which medicinal plant use can be considered dangerous and should be discouraged? What type of plant use should be stimulated as it offers cheap solutions for expensive synthetic drugs?

Summary and Conclusions

Ethnobotanical fieldwork shows that most medicinal plants are weeds, harvested close to human settlements, as people are familiar with these species and weeds contain lots of phytochemicals. Pregnant women in Sub-Sahara Africa eat several wild plant species to ensure the growth of their fetus, but the nutritional properties of these herbs have never been studied. What (medicinal) food can offer cheap substitutions for synthetic medicine? How do anti-diabetic vegetables work? The answers to these questions will not generate a large income for the pharmaceutical industry, but they can save many lives worldwide. For this reason, we still need information from folk medicine and continue to do ethnopharmacological and ethnobotanical fieldwork.

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The red seaweeds *Asparagopsis taxiformis* (AT) and *A. armata* contain halogenated compounds such as bromoform ($CHBr_3$), which has shown to strongly decrease enteric CH_4 emissions.[2,4] The most likely responsible bioactive compound for the observed reductions in CH4 emissions, which is present in sufficient quantities in *A. taxiformis* was CHBr3.[3]

Materials and methods

Animal experiment. In this study we investigated the transfer of $CHBr_3$ from AT to milk, urine, feces, and animal tissue, when AT was mixed within the feed. For this twelve non-pregnant lactating Holstein-Friesian dairy cows were randomly assigned to three treatment groups, 1) target dose (low: 67 g DM AT/day), 2) 2× target dose (medium: 133 g DM AT/day), and 3) 5× target dose (high: 333 g DM AT/day)y. The adaptation period lasted seven days, and subsequently the cows were fed *A. taxiformis* for 22 days maximally.

Analysis. A sample (ca 200 g) of each feed ingredient (excluding *A. taxiformis*) was collected weekly and stored at −20 °C pending chemical analysis. Weekly milk samples were collected from all animals. Bromoform was determined in different matrices using two-dimensional gas chromatography and with time-of-flight mass spectrometry (GCxGC-TOFMS).

Results

Due to significant problems with uptake of the seaweed mix, the experiment was stopped prematurely. One cow was euthanized on on day 13, due to abomasal displacement. The transfer of $CHBr_3$ to the urine at days 1 and 10 (10–148 µg/L) was found with all treatments.

Pathology: Two animals from the low- group, which continued eating the AT were sacrificed. Visual inspection of the rumen wall showed the absence of rumen papillae on a large area, combined with clearly visible haemorrhages and ulcers (cow L1) and local spots with loss of rumen papillae and thickening of the rumen wall (cow L6).

Discussion

Other studies in cattle did show reduction of methane, but did not investigate animal health.[4] In earlier research in sheep[5] fed with these seaweeds also showed pathological changes of the ruminal mucosa, consisting of granulomatous and keratotic changes. Our animals regularly refused the feed or distinctively selected against AT. Because animals even refused to eat at all, the experiment had to be terminated earlier than planned (at day 22 instead of day 35).

Conclusions

Within the confines of the present experiment, $CHBr_3$ did not accumulate in animal tissue, but can be excreted in urine and milk. Moreover the cattle had difficulty eating the mix, especially the medium and high doses and some animals showed lesions in the ruminal epithelium.

Refererences

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2 Machado, L.; Magnusson, M.; Paul, N.A.; Kinley, R.; de Nys, R.; Tomkins, N. Dose-response effects of *Asparagopsis taxiformis* and Oedogonium sp. on in vitro fermentation and methane production. J. Appl. Phycol. 2016, 28, 1443–1452, doi:10.1007/s10811-015-0639-9.

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P 018

Quality assesment of Commercial Willow-Herbs

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Introduction

The problem of quality control of herbal products in the pharmaceutical market is multifaceted.[1] The therapeutic effectiveness of herbal products depends on the presence of specific metabolites, known as (active or quality) marker compounds, which can be responsible for their nutritional and therapeutically effects. In addition, climate, soil conditions, harvesting methods and post-harvesting practices are important factors in the variability of component composition. It should be noted that plant-based products are subject to intentional and unintentional falsification, which also affects their quality. Quality control ensures the presence of marker compounds in predefined concentrations, helping to ensure the reliability and therapeutic effectiveness of the product. *Epilobium* species, commonly known as fireweed or willow herb, are traditionally used for their anti-inflammatory and aphrodisiac properties. The most commonly used leaves or herbs are *Epilobium parviflorum* Schreb., *Epilobium hirsutum* L. and *Epilobium angustifolium* L. Like other herbal products, herbal teas from *Epilobium* species must meet safety standards and ensure the presence of bioactive compounds. Monitoring helps maintain product consistency, ensuring that consumers receive reliable and effective herbal products. This project aims to test the presence of marker compounds in commercial samples of *Epilobium* species commonly available on the European market.

Material and Methods

Ten commercial samples of *Epilobium* species samples were purchased or donated in the form of roughly ground plant material. Polyphenolics were studied using methanol (50%, v/v) with chlorogenic acid, avicularin, guajaverin, isoquercitrin and hyperoside as reference standards. The analysis was carried out in HPTLC plates Si 60 F254 (Merck) in ethyl acetate: formic acid: water (68:8:8) as mobile phase. Detection was conducted at 365 nm after derivatization by 2-aminoethyldyphenylborinate 1% solution followed by 5% macrogol 400 in methanol reagents.

Results and Discussion

Samples of *E. parviflorum* (Poland, Bulgaria, and Germany) had a similar metabolite profile, but the German sample had less intense zones compared to others. *E. parviflorum* sample (as specified by the manufacturer) from the UK had a profile closer to the specimens of *E. angustifolia* (specimens from Greece, Great Britain, and Ukraine). These 4 samples had a yellow zone at R_f value of 0.37; the profile of the zone coincided with the hyperside standard. These data are consistent with our previously study of *E. angustifolium* samples from Ukraine, collected during three flowering phases []. The most important polyphenolic compounds were chlorogenic acid, hyperoside, isoquercetin and oenothein B and their maximum accumulation was noted during the late flowering period (end of July). The three samples of *E. hirsutum* had a similar profile, but there was a clear difference in the quantitative content of the substances. All reference standards were found in samples but in different concentrations: yellow fluorescent zones at R_f values of 0.4, 0.37, 0.85 and 0.52 were in line with isoquercitrin, hyperoside, avicularin and guajaverin, respectively, as main components. The presented method can be used for assessing the *Epilobium* quality as botanical drugs or finished commercial products.

Conclusion

Overall, monitoring the quality of *Epilobium* species-derived products is essential for ensuring their safety, efficacy, and authenticity, thereby promoting consumer confidence and supporting their continued use in traditional and complementary medicine.

References:

1 Zhang J., Wider B., Shang H., Li X., Ernst, E. Quality of herbal medicines: Challenges and solutions. Complementary Therapies in Medicine, 2012, 20(1-2), 100–106.

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3 Ivanauskas L., Uminska K., Gudžinskas Z., Heinrich M., Georgiyants V., Kozurak A., Mykhailenko O. Phenological Variations in the Content of Polyphenols and Triterpenoids in Epilobium angustifolium Herb Originating from Ukraine. Plants 2024, 13(1), 120-142.

P 019

PhytoVIS - a success story: Analysis of data from the PhytoVIS database in 20,870 users of herbal medicinal products with focus on vulnerable groups and pain

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Introduction

Herbal medicinal products (HMPs) are an important part within the framework of self-medication supported by pharmacies and physicians. In this area findings on application experience as well as on benefits and risks can be obtained with adequate supply research. To date, there has been limited data available on the use of HMPs for self-medication, particularly by vulnerable groups such as children and geriatric patients. In

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Quality assessment of Commercial Willow-Herbs (*Epilobium* spp.)

Olha Mykhailenko [1,2], Banaz Jalil [1], Michael Heinrich [1,3*]

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[2] *National University of Pharmacy, Kharkiv, Ukraine;*
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KEY OUTCOMES (CONCLUSION): Overall, monitoring the quality of *Epilobium* species-derived products is essential for ensuring their safety, efficacy, and authenticity. This will promotie consumer confidence and support their continued use in traditional and integrative medicine.

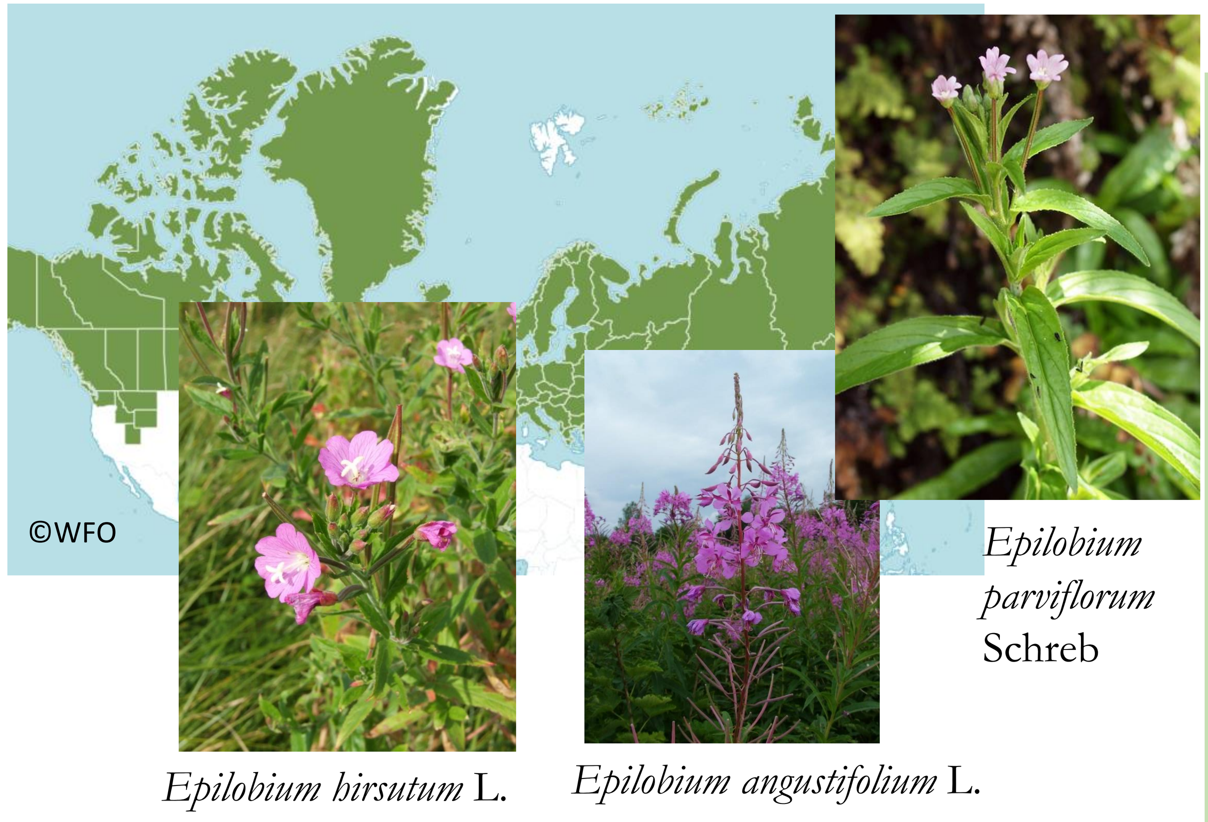

Figure 1: The core species used medicinally

Background

- Quality control of herbal products in the pharmaceutical market is multifaceted [1]. The therapeutic effectiveness of herbal products depends on the presence of specific metabolites, known as (active or quality) marker compounds, relevant for their nutritional and therapeutic effects.
- Climate, soil conditions, harvesting methods and post-harvesting practices are important factors in the variability of metabolite composition. Plant-based products are subject to intentional and unintentional falsification/adulteration, affecting their quality. Quality control ensures the presence of marker compounds in predefined concentrations, helping to ensure the reliability and therapeutic effectiveness of the product.
- *Epilobium* species, commonly known as fireweed or willow herb, are traditionally used for their anti-inflammatory and aphrodisiac properties. The most commonly used leaves or herbs are *Epilobium parviflorum* Schreb., *Epilobium hirsutum* L. and *Epilobium angustifolium* L. Like other herbal products, herbal teas from Epilobium species must meet safety standards and ensure the presence of bioactive compounds.
- This project aims to test the presence of marker compounds in commercial samples of *Epilobium* species commonly available on the European market.

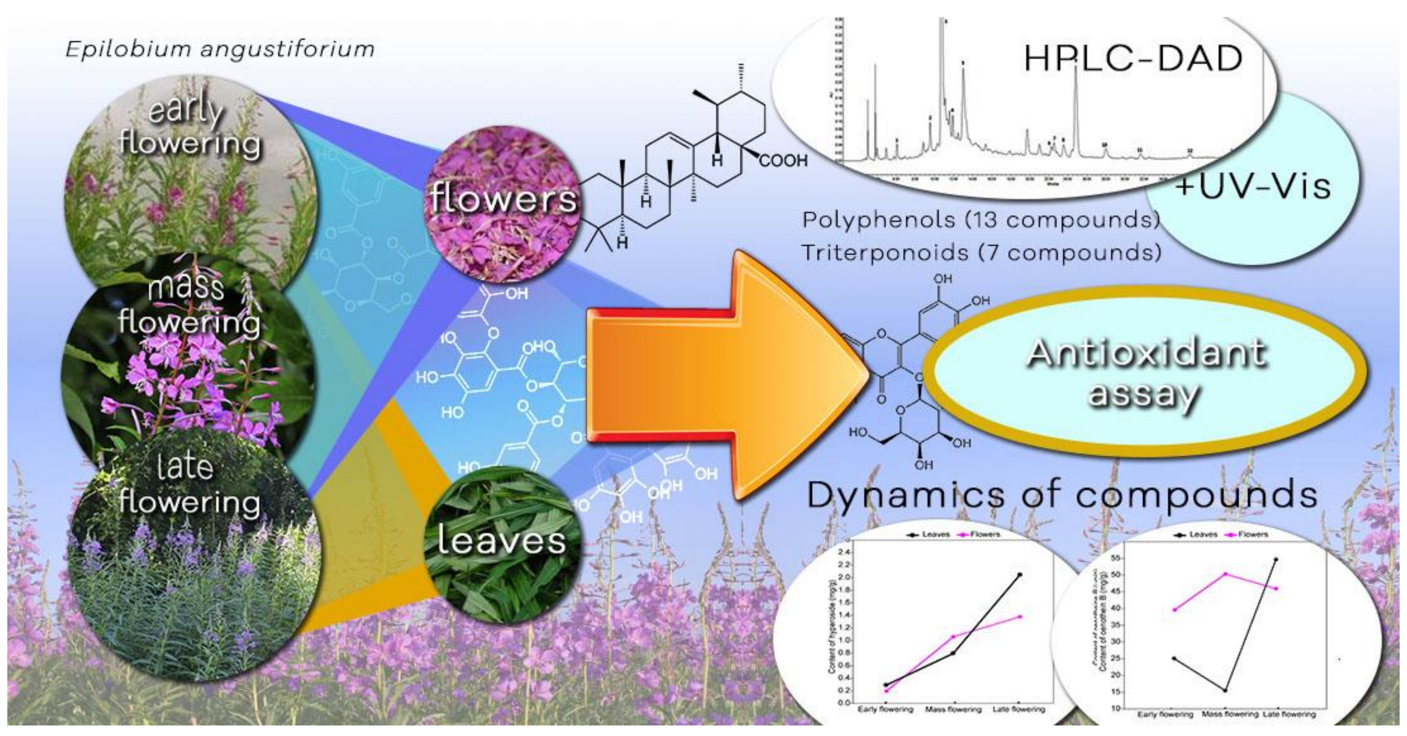

Figure 3: Overall workflow and research strategy

Code	Epilobium species	HRM	Brand name	Country	Used before
CS-1	E. parviflorum	herb	Dary Natury	Poland	2025
CS-2	E. parviflorum	herb	Organic Bulk tea herba	Bulgaria	2025
CS-3	E. parviflorum	herb	Heaven 2 earth healing	Germany	2026
CS-4	E. parviflorum	herb	Health embassy	UK	2024
CS-5	E. parviflorum	herb	The Spice works	UK	2025
CS-6	E. parviflorum	herb	Carpathian tea. Pidbil	Ukraine	2025
CS-7	E. hirsutum	herb	Fares	Romania	2025
CS-8	E. hirsutum	herb	Lletuvole	Germany	2025
CS-9	E. hirsutum	herb	Carpathian tea. Pidbil	Ukraine	2025
CS-10	E. hirsutum	herb	OBH Balthic herb	Lithuania	2025
CS-11	E. angustifolium	herb	Greekherbay	Greek	2024
CS-12	E. angustifolium	leaves	YouHerblt	Greece	2025
CS-13	E. angustifolium	herb	Health Embassy	UK	2025
CS-14	E. angustifolium	leaves	Organic herbal tea	UK	2025
CS-15	E. angustifolium	herb	Carpathian tea. Pidbil	Ukraine	2025
CS-16	E. angustifolium	herb	Acorus Calamus	Lithuania	2025

Figure 2: Different samples of *Epilobium*. (1) *E. parviflorum*, UK, Poland, Bulgaria, UK, Germany, Ukraine
E. angustifolium: UK (2), Greece (3), Lithuania, Ukraine
E. hirsutum: (4) Romania, Germany, Lithuania, Ukraine

Results & Discussion

- Samples of *E. parviflorum* (Poland, Bulgaria, and Germany) had a similar metabolite profile, but the German sample had less intense zones compared to others. *E. parviflorum* sample (as specified by the manufacturer) from the UK had a profile closer to the specimens of *E. angustifolia* (specimens from Greece, Great Britain, and Ukraine). These 4 samples had a yellow zone at R*f* value of 0.37; the profile of the zone coincided with the hyperside standard (Fig. 5).
- These data are consistent with our previous study of *E. angustifolium* samples from Ukraine, collected during three flowering phases [3]. The most important polyphenolic compounds were chlorogenic acid, gallic acid, hyperoside, isoquercetin and oenothein B and their maximum accumulation was noted during the late flowering period (end of July).
- The three samples of *E. hirsutum* had a similar profile, but there was a clear difference in the quantitative content of the substances.
- All reference standards were found in samples but in different concentrations, e.g., yellow fluorescent zones at Rf values of 0.4, 0.37, 0.85 and 0.52 were in line with isoquercitrin, hyperoside, avicularin and guajaverin, respectively, as main components (Fig. 5).
- The presented method can be used for assessing the Epilobium quality as botanical drugs or finished commercial products.
- Our previous results using the HPLC-PDA method showed the presence of 13 polyphenolic compounds (Fig. 4) and seven triterpenoids [3] in *E. angustifolium* plant materials. The largest content and the best polyphenol profile were noted during late flowering. The most important polyphenolic compounds in the plant material were chlorogenic acid, hyperoside, isoquercitin, and oenothein B.
- These data can be used to define the best harvesting time of the raw materials.

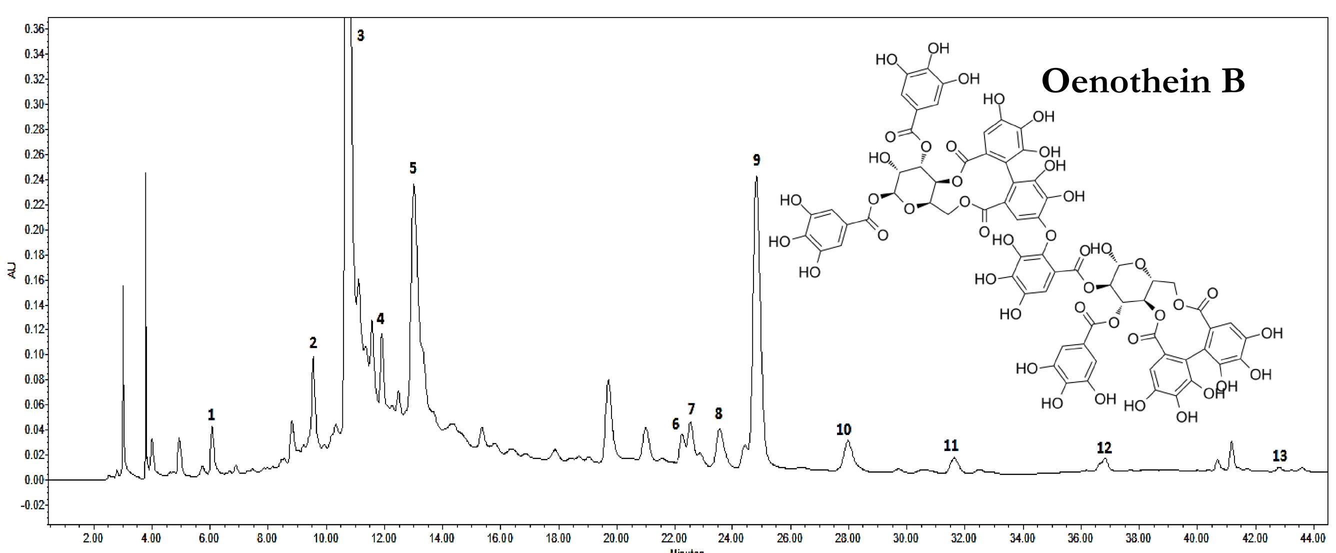

Figure 4: Representative HPLC-DAD chromatograms of polyphenols of E. angustifolium flowers harvested during early flowering. Peak assignments: 1—gallic acid; 2—neochlorogenic acid; 3—oenothein B; 4—chlorogenic acid; 5—oenothein A; 6—ellagic acid; 7—rutin; 8—hyperoside; 9—isoquercitrin; 10—guaijaverin (quercetin-3-O-arabinopyranoside); 11—quercitrin; 12—afzelin (kaempferol-3-O-rhamnoside); 13—quercetin.

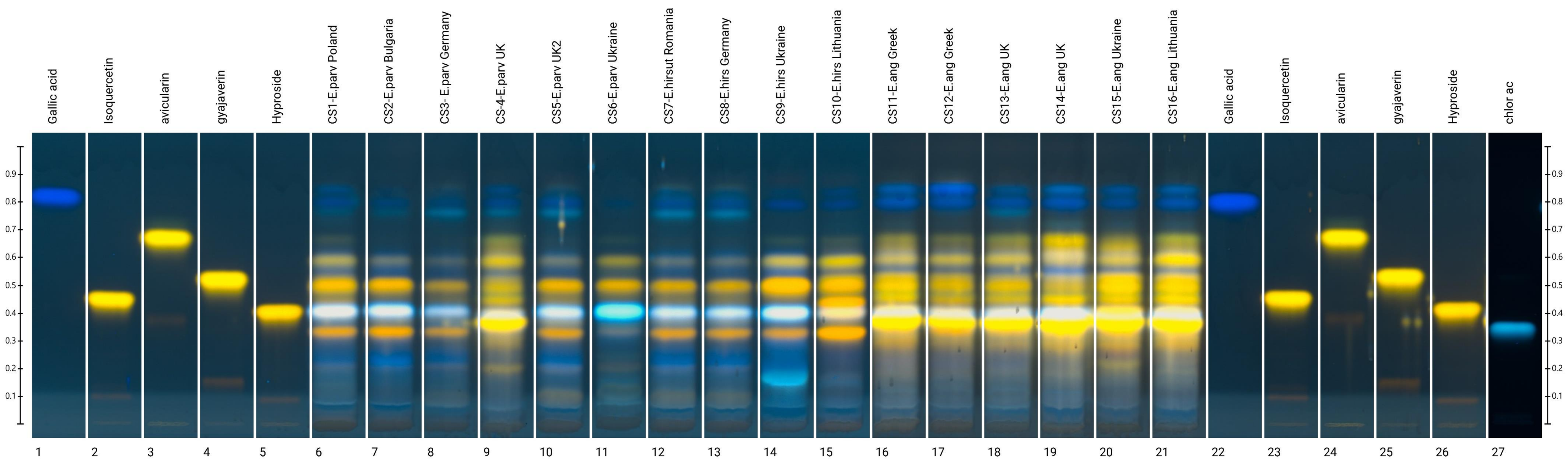

Figure 5: HPTLC image shows the presence of all five major compounds in *Epilobium* samples: gallic acid, chlorogenic acid, isoquercitrin, hyperoside and avicularin.

Materials and Methods

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References
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