Extraction and HPLC-UV Analysis of Usnic Acid in *Usnea barbata* Collected in the Altai Krai

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Introduction

Usnea barbata L. (*Parmeliaceae* Zenker.) is used in folk medicine as an antimicrobial agent in various diseases of bacterial genesis (bronchitis, tuberculosis, microbial eczema). The antimicrobial activity of Usnea is associated with the presence of the lichen acids, especially usnic acid.

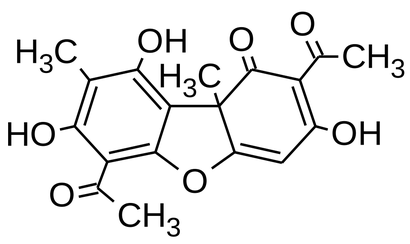


Fig 1. Usnic acid

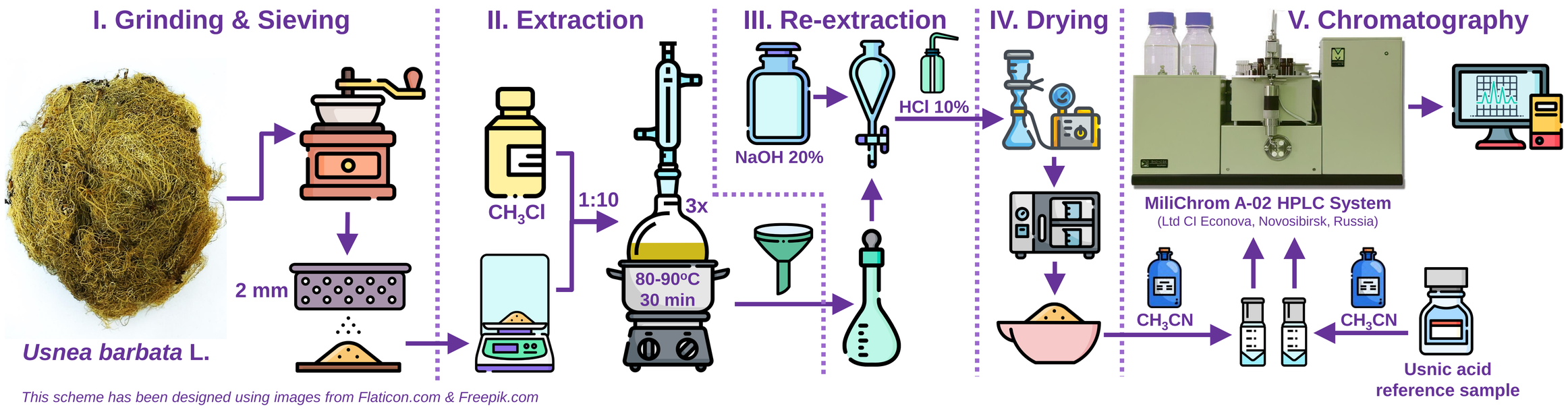
Aim

Aim of the study is isolation, identification and assay of usnic acid by High Performance Liquid Chromatography.

Research Object

Raw material - lichen *Usnea barbata* collected from tree branches in the Altai Krai during the growing season (June-July 2022).

Research Design



This scheme has been designed using images from Flaticon.com & Freepik.com

The chromatographic separation conditions:

- **chromatography column** - reverse-phase, ProntoSIL 120-5 C18 (75×2.0 mm, 5 μm);
- **column oven temperature** - 40°C;
- **mobile phase** - 0.1% aqueous solution of trifluoroacetic acid (solvent A) and 100% acetonitrile (solvent B);
- **mobile phase flow rate** - 150 μL/min with gradient elution, initialy from 10 to 50% of solvent B in 5 minutes, gradually increased to 100% up to 20 minutes
- **detection** - UV-spectrophotometric detector (λ = 230, 280 nm)
- **reference sample** - 0.05% usnic acid acetonitrile solution sample injection volume - 4 μL using an autoinjector
- **chromatogram processing** by «MultiChrome for Windows» software

Results

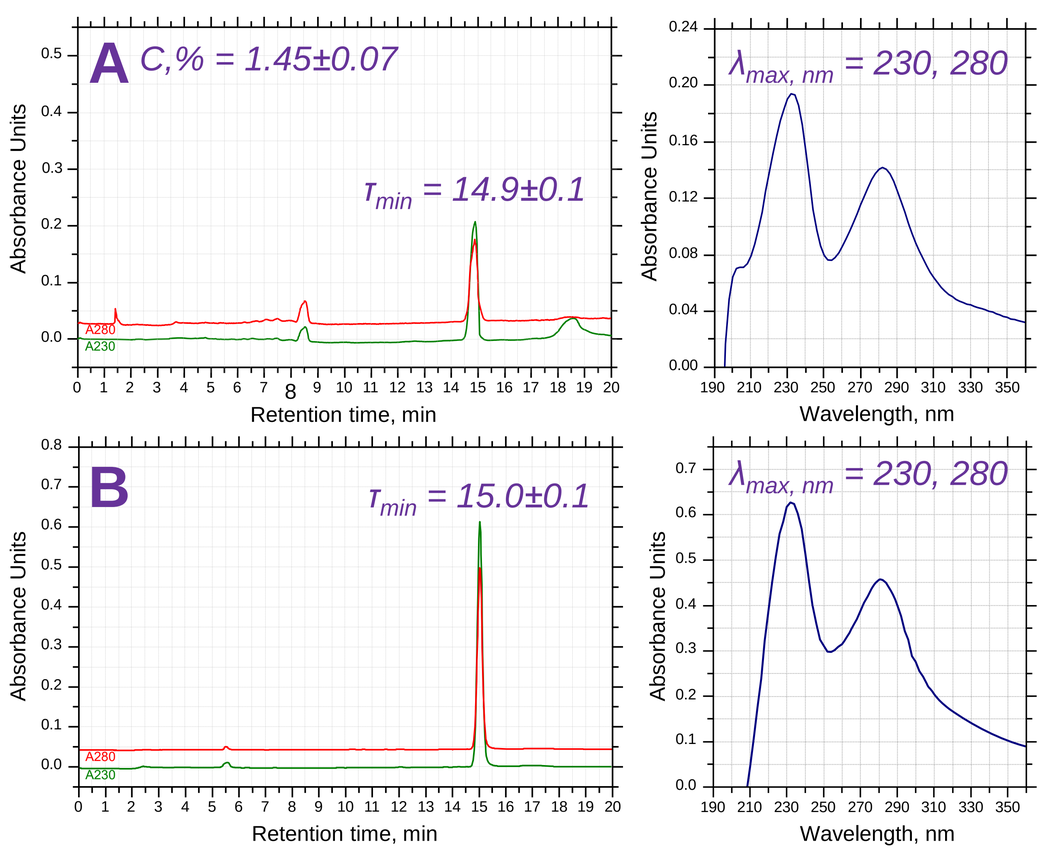


Fig 2. Chromatograms and UV-spectra of the studied extract (A) and a reference solution of usnic acid (B)

Conclusion

1. By comparing the retention times (τ = 14.9±0.1 min) and spectral characteristics (λmax = 230, 280 nm) with those of the 0.05% UA reference sample solution (τ = 15.0±0.1 min), the presence of UA in the studied thallus was established.
2. Quantitative content, calculated from the peak area, compared with the peak area of the reference sample -1.45±0.07%.

References

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