Analysis of the Chemical Composition and Stability of Aromatic Hydrosols

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Introduction

Rigorous control of the chemical stability of aromatic hydrosols (AHs) is crucial to determine appropriate storage conditions and expiry dates. Standardised methods or normative guidelines for analysing the chemical composition of AHs are rare [1].

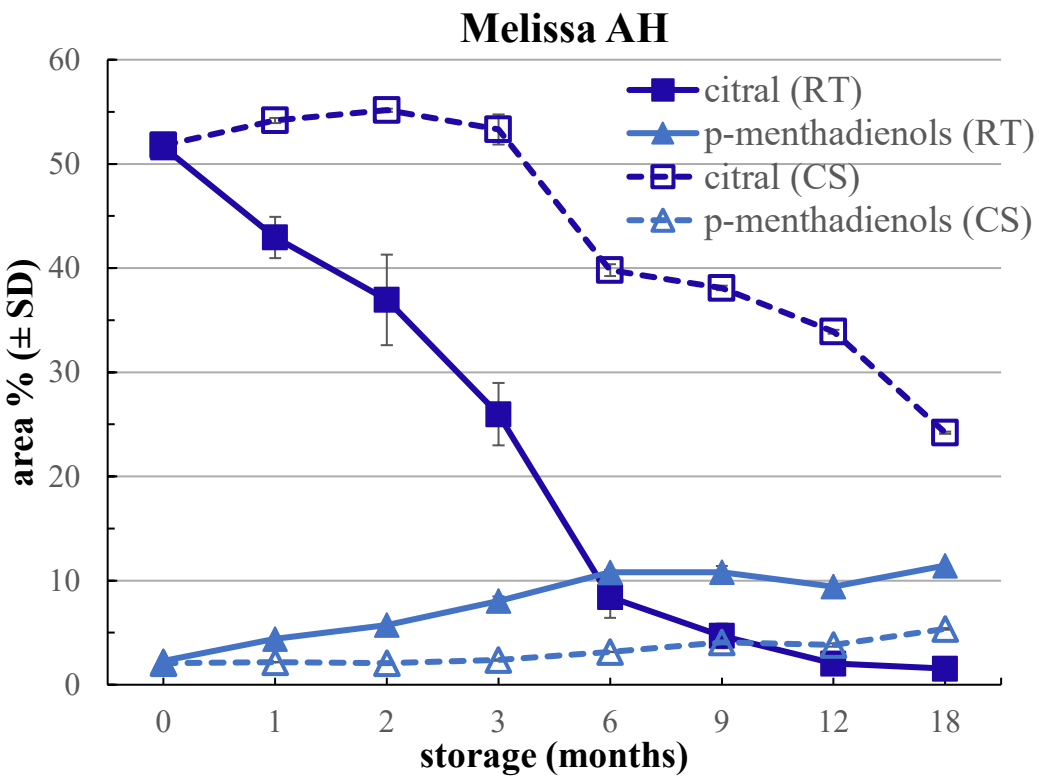
Study aim: Development of an analytical method to monitor key indicators of chemical stability of AHs.

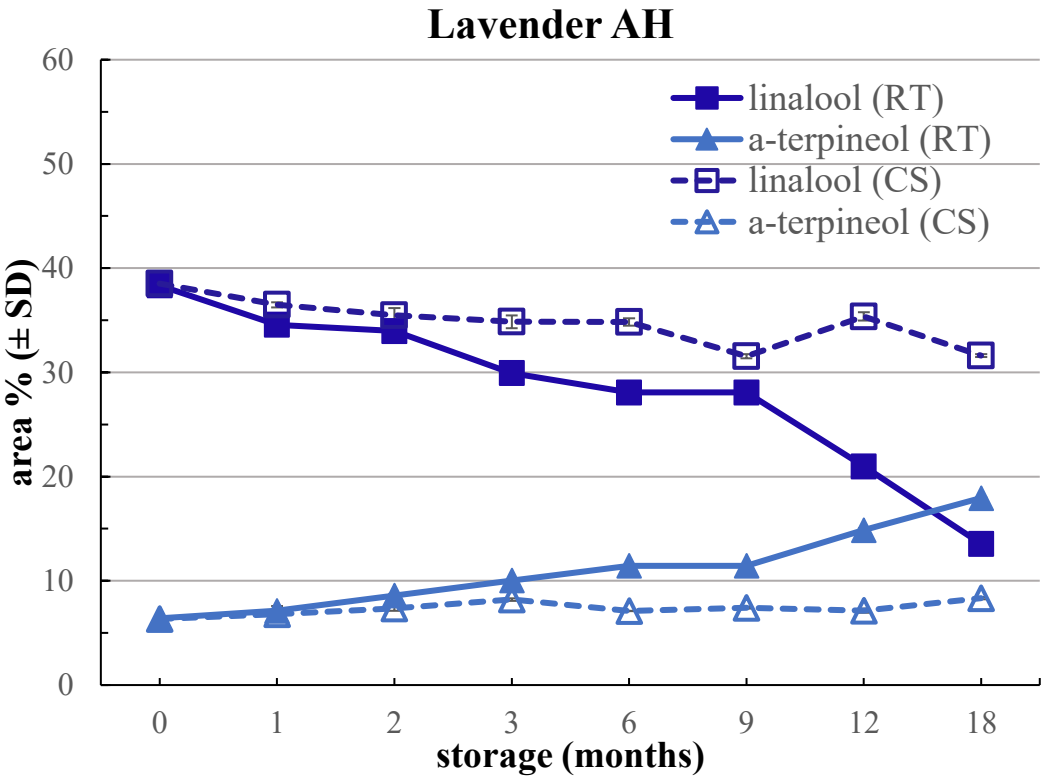
Materials & Methods

- Commercial *Melissa officinalis* L. and *Lavandula angustifolia* L. AHs from organic farming and production
- Drawing of samples under sterile conditions to avoid microbial contamination
- Storage in amber bottles at RT (20 °C) and CS (2–8 °C) for 1, 3, 6, 9, 12, and 18 months (n = 3 per time point)
- Measurement of *p*H (Mettler Toledo Seven2Go pH meter w/ InLab® Expert Go-ISM electrode) at each time point
- Analysis of chemical composition at each time point by LLE/GC-MS/-FID:

Liquid liquid extraction	GC conditions
1) Shake 10 ml hydrosol + 3.56 g NaCl	PE Clarus 680 w/ Restek Stabilwax column 0.25 mm ID, 60 m
2) Add 1 ml *n*-hexane, shake for 3 min	Injector temp. 220 °C, injection vol. 1 µl
3) Pipet hexane phase into GC vial	Carrier gas: He 250 kPa, split flow 20 ml/min
4) Repeat steps 2) and 3)	Oven temp program: 40 °C (5 min) to 240 °C at 2.3 °C/min (1.39 min) to 250 °C at 10 °C/min (0.65 min); total run time: 95 min
	MS: EI+, scan mode: 15-355 m/z; FID: 300 °C
	Compound identification: NIST + internal databases for MS data and retention times

Results & Discussion





- ***p*H:** stable in all samples at both storage temperatures, validity as stability predictor questionable
- **Chemical stability:** dependent on storage conditions and reactivity of AH compounds ⇒ specific parameters for each AH needed
  - **Melissa AH:** pronounced decline of citral [2], particularly at RT; formation of *p*-menthadienol isomers
  - **Lavender AH:** chemically more stable than Melissa AH; decline of linalool [3]; increase of α-terpineol [4], probably due to rearrangement and cyclisation of linalool [5]

References

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