13 hranom do zdravlja with food to health

OSIJEK, CROATIA 2021

ESSENTIAL OILS IN WILD ISTRIAN FENNEL (*Foeniculum vulgare* Mill.): VARIABILITY IN THE CONTENT AND COMPOSITION

Maja Repajić[1]*, Ena Cegledi[1], Igor Palčić[2], Nina Marčac[3], Verica Dragović-Uzelac[1]

[1]Faculty of Food Technology and Biotechnology, University of Zagreb, Pierottijeva 6, 10000 Zagreb, Croatia
[2]Institute of Agriculture and Tourism, Karla Huguesa 8, 52440 Poreč, Croatia
[3]IREKS AROMA Ltd., Trešnjevka 24, 10450 Jastrebarsko, Croatia
*maja.repajic@pbf.unizg.hr

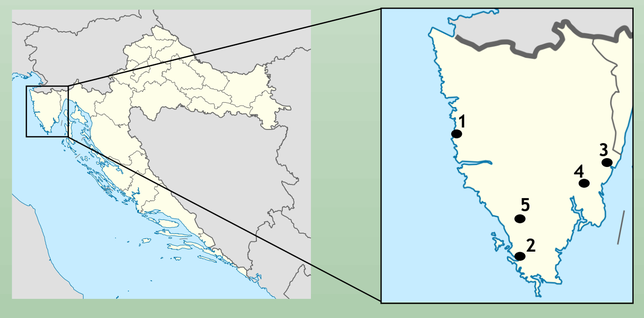
INTRODUCTION

Fennel (*Foeniculum vulgare* Mill.) is a ubiquitous member of the Apiaceae family whose fruits (seeds) are used extensively as flavoring agents in food, cosmetic and pharmaceutical products (Sayed-Ahmad et al., 2017). Fennel seeds are rich in essential oils (EO), the content and composition of which may vary according to geographical origin (Díaz-Maroto et al., 2006). Therefore, this study aimed to evaluate EO variation in wild fennel seeds collected from five natural habitats located in Istria region (Croatia): Poreč, Pula, Plomin, Raša and Vodnjan.

EXPERIMENTAL

1 wild fennel

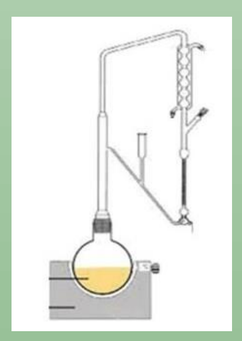
(1) Poreč
(2) Pula
(3) Plomin
(4) Raša
(5) Vodnjan



2 dry mature fennel seeds

grinding

hydrodistillation, 2 h



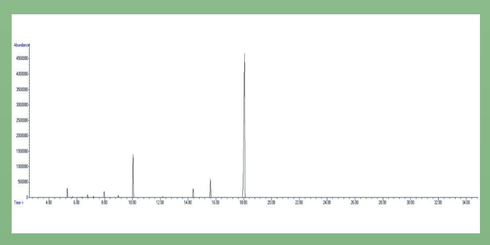
Na_2SO_4 anhydrous

3 dillution 100 X
10 µL EO
100 µL internal standard (nerol; 10.518 mg mL^{-1})
890 µL *n*-hexane

EO

GC-MS

Agilent Technologies 6890N/5973i MSD



- column HP-5MS [(5%-phenyl)-methylpolysiloxane; 30 m × 0,25 mm × 0,25 µm]
- gas carrier helium at flow of 1 mL min^{-1}, injection volume 1 µl, split ratio 100:1
- $T_{injector}$=250 °C, $T_{transfer\ line}$=280 °C, $T_{detector}$=250 °C, temperature regime: 60 – 145 °C, 3 °C/min; 145 – 250, 30 °C/min; 250 °C/3 min

4 ANOVA / Tukey's HSD test ($p \leq 0.05$)

CONCLUSION

- The samples differed significantly according to the EO yield, which ranged from 4.90 (Plomin) to 6.30% (Pula)
- A total of 20 volatiles were identified and quantified
- Phenylpropanoids dominated in all samples (71.33-77.31%), followed by oxygenated monoterpenes (14.40-18.32%) and monoterpene hydrocarbons (7.48-12.02%)
- *Trans*-anethole (15.57-70.94%), estragole (6.18-55.89%) and L-fenchone (11.60-16.85%) were the major constituents, while α-pinene, myrcene and D-limonene were present in lower but noticeable amounts (1.85-3.78, 1.66-2.63 and 1.04-1.57%, respectively)

References

- Díaz-Maroto, M. C., Pérez-Coello, M. S., Esteban, J., Sanz, J. (2006) Comparison of the volatile composition of wild fennel samples (Foeniculum vulgare Mill.) from Central Spain. Journal of Agricultural and Food Chemistry, 54(18), 6814-6818.
- Sayed-Ahmad, B., Talou, T., Saad, Z., Hijazi, A., Merah, O. (2017) The Apiaceae: Ethnomedicinal family as source for industrial uses. Industrial crops and products, 109, 661-671.

RESULTS

Table 1. Volatiles identified in wild fennel EO

Peak no.	RT (min)	Compound	Peak no.	RT (min)	Compound
1	5.380	α-pinene	11	9.074	γ-terpinene
2	5.759	camphene	12	9.370	*cis*-sabinene hydrate
3	6.400	sabinene	13	10.141	L-fenchone
4	6.500	ß-pinene	14	10.562	linalool
5	6.856	myrcene	15	12.293	camphor
6	7.283	α-phellandrene	16	14.172	α-terpineol
7	7.668	α-terpinene	17	14.528	estragole
8	7.917	*p*-cymene	18	16.253	carvone
9	8.048	D-limonene	19	16.763	*p*-anisaldehyde
10	8.143	eucalyptol	20	18.145	*trans*-anethole

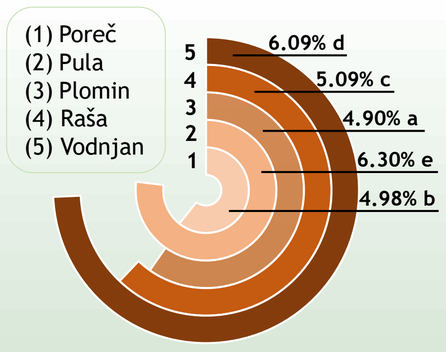


Figure 1. Yield of EO from wild fennel collected at different locations in Istria

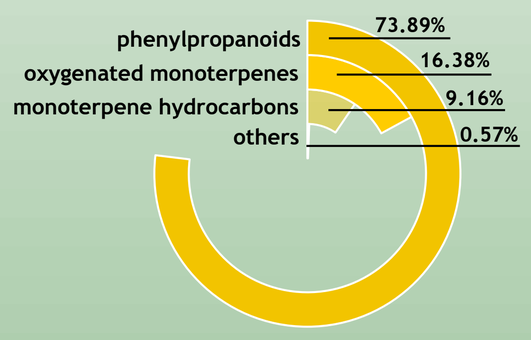


Figure 2. Average chemical composition and of wild Istrian fennel EO

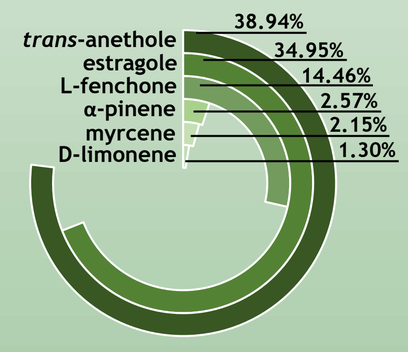


Figure 3. Average content of major constituents in wild Istrian fennel EO

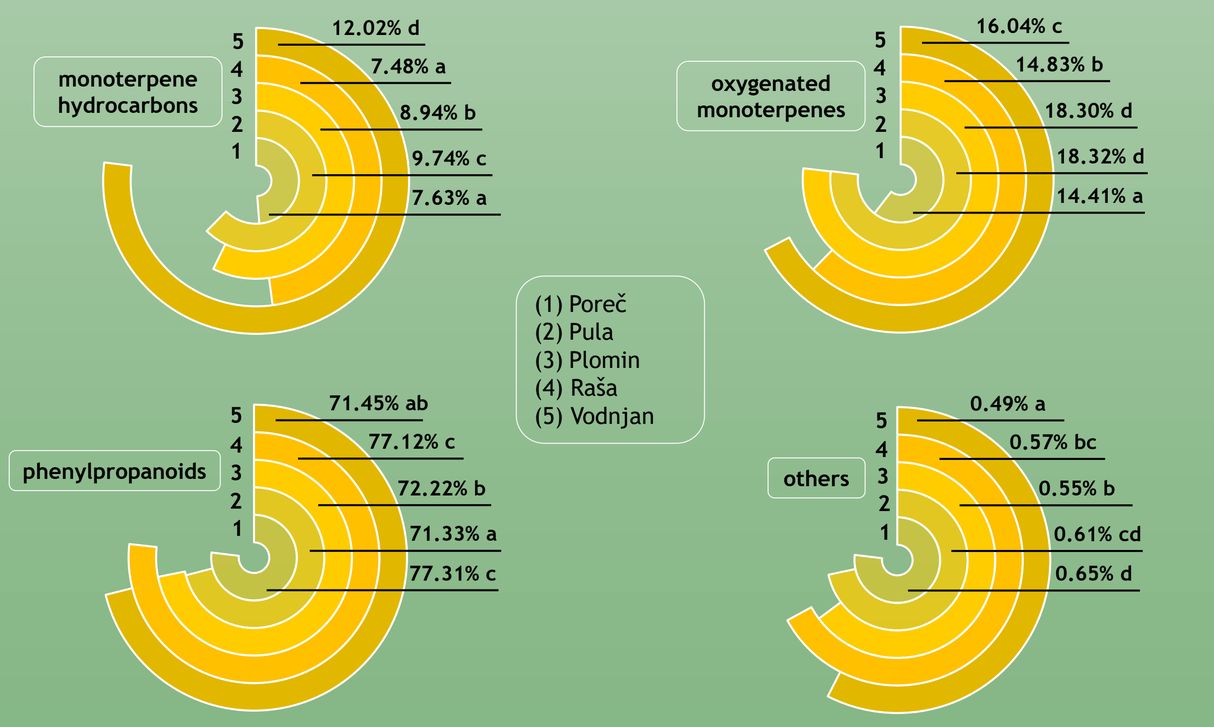


Figure 4. Chemical composition of EO from wild fennel collected at different locations in Istria

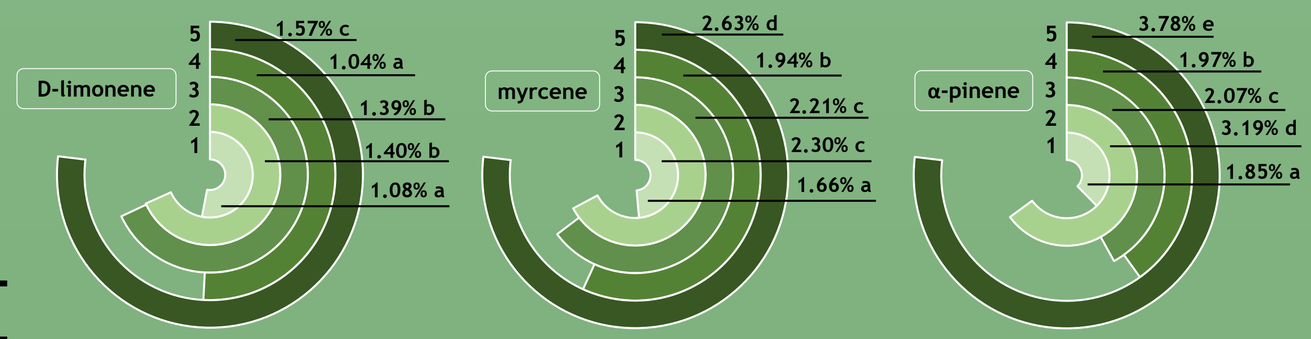


Figure 5. Content of major constituents in EO from wild fennel collected at different locations in Istria

This work was supported by the Croatian Science Foundation project „Isolation and encapsulation of bioactive molecules of wild and cultivated nettle and fennel and effects on organism physiology“ (HRZZ IP-01-2018-4924)

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