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COMPOSITION OF THE ESSENTIAL OIL OF *Centaurea saligna*

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In Turkey, the genus *Centaurea* is represented by 182 species including 113 endemics, distributed particularly in the Southwest, Central, and Eastern parts of the country [1, 2]. The ratio of endemism is quite high (62.1%).

This paper reports the essential oil composition of *Centaurea saligna*, an endemic plant in Turkey. To the best of our knowledge, this is the first report on the essential oil chemistry of this species.

Plant material was collected from Erzincan: Kesis Mountain in July 2004. Voucher specimens are kept at the Herbarium of the Faculty of Pharmacy, Anadolu University in Eskisehir, Turkey (ESSE 14420).

The air-dried aerial parts of the plant were hydrodistilled for 3 h using a Clevenger-type apparatus to produce a small amount of essential oil, which was trapped in *n*-hexane.

TABLE 1. The Composition of the Essential Oil of *Centaurea saligna*

Compound	RRI	%	Compound	RRI	%
Nonanal	1400	Tr.	Isophytol	2296	0.5
Decanal	1506	0.2	Decanoic acid	2298	0.2
Linalool	1553	0.3	Tricosane	2300	0.8
Octanol	1562	0.1	Caryophylla-2(12),6(13)-dien-5α-ol (=Caryophylladienol II)	2324	0.2
α-Terpineol	1706	0.3	(2*Z*,6*E*)-Farnesol	2341	0.6
(*E*)-2-Undecenal	1764	0.2	Eudesma-4(15),7-dien-1β-ol	2369	1.2
δ-Cadinene	1773	0.1	Caryophylla-2(12),6-dien-5α-ol (=Caryophyllenol I)	2389	0.6
(*E*)-β-Damascenone	1838	0.5	Caryophylla-2(12),6-dien-5β-ol (=Caryophyllenol II)	2392	1.7
(*E*)-Geranyl acetone	1868	0.2	Pentacosane	2500	3.0
α-Calacorene	1941	0.2	Dodecanoic acid	2503	2.5
1,5-Epoxy-salvial(4)14-ene	1945	0.4	1-Octadecanol	2607	Tr.
(*E*)-β-Ionone	1958	0.2	Phytol	2622	8.2
1-Dodecanol	1973	0.2	Tetradecanoic acid	2670	Tr.
Caryophyllene oxide	2008	2.8	Heptacosane	2700	5.2
Salvial-4(14)-en-1-one (=mint ketone)	2037	0.1	Pentadecanoic acid	2822	Tr.
(*E*)-Nerolidol	2050	2.6	Nonacosane	2900	0.7
Humulene epoxide-II	2071	0.6	Hexadecanoic acid	2931	41.9
Salviadienol	2130	0.6	Oxygenated monoterpenes		4.9
Fokienol	2174	1.6	Sesquiterpene hydrocarbones		0.3
T-Muurolol	2209	0.4	Oxygenated sesquiterpenes		14.6
Carvacrol	2239	4.1	Diterpenes		8.7
α-Cadinol	2255	0.3	Others		55.7
Torilenol	2278	0.9	Total		84.2

RRI: relative retention indices calculated against *n*-alkanes; %calculated from FID data; Tr.: trace (<0.1%).

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The GC-MS analysis was carried out with an Agilent 5975 GC-MSD system. An Innowax FSC column (60 m × 0.25 mm, 0.25 μm film thickness) was used with helium as carrier gas (0.8 mL/min). GC oven temperature was kept at 60°C for 10 min, and programmed to 220°C at a rate of 4°C/min, and kept constant at 220°C for 10 min and then programmed to 240°C at a rate of 1°C/min. Split ratio was adjusted at 40:1. The injector temperature was set at 250°C. Mass spectra were recorded at 70 eV. Mass range was from *m/z* 35 to 450.

The GC analysis was carried out using an Agilent 6890N GC system. FID detector temperature was 300°C. To obtain the same elution order with GC/MS, simultaneous autoinjection was done on a duplicate of the same column applying the same operational conditions. Relative percentage amounts of the separated compounds were calculated from FID chromatograms. The results of the analysis are shown in Table 1.

Identification of the essential oil components was carried out by comparison of their relative retention times with those of authentic samples or by comparison of their relative retention index (RRI) to series of *n*-alkanes. Computer matching against commercial (Wiley GC/MS Library, Adams Library, MassFinder 2.1 Library) [3, 4] and the in-house "Baser Library of Essential Oil Constituents" built up by genuine compounds and components of known oils, as well as MS literature data [5–7], was used for the identification.

The essential oil was obtained from the aerial parts of *C. saligna* by hydrodistillation. The oil was analyzed by GC and GC/MS. Forty compounds representing 84.2% of the essential oil were characterized as listed in the Table 1. Hexadecanoic acid (41.9%), phytol (8.2%), heptacosane (5.2%), and carvacrol (4.1%) were the main components detected.

REFERENCES

1. P. H. Davis, *Flora of Turkey and East Aegean Islands*, Edinburgh,Univ. Press., Vol. **5**, 1975, pp. 465–585.
2. A. Altintas, Y. B. Kose, E. Yucel, B. Demirci, and K. H. C.Baser, *Chem. Nat. Comp*., **40**, 604 (2004)
3. F. W. McLafferty and D. B. Stauffer, *The Wiley/NBS Registry of Mass Spectral Data*, J Wiley and Sons: New York, 1989.
4. D. Joulain, W. A. Konig, and D. H. Hochmuth, *Terpenoids and Related Constituents of Essential Oils. Library of MassFinder 2.1*, Hamburg, Germany, 2001.
5. D. Joulain and W. A. Konig, *The Atlas of Spectra Data of Sesquiterpene Hydrocarbons*, EB-Verlag, Hamburg, 1998.
6. ESO 2000, *The Complete Database of Essential Oils, Boelens Aroma Chemical Information Service*, The Netherlands, 1999.
7. W. G. Jennings, T. Shibamoto, *Quantitative Analysis of Flavor and Fragrance Volatiles by Glass Capillary GC,* Academic Pres, New York, 1980.