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COMPOSITION OF THE ESSENTIAL OIL OF *Centaurea dichroa*

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

This paper reports the essential oil composition of *Centaurea dichroa* Boiss. & Heldr., an endemic plant from Turkey. Plant material was collected from Antalya: Tekirova, Cirali in June 2003. Voucher specimens are kept at the Herbarium of the Faculty of Pharmacy, Anadolu University in Eskisehir, Turkey (ESSE 14361, 14362).

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.

The oil was analyzed by GC using a Hewlett Packard 6890 system. An HP-Innowax FSC column (60m × 0.25 mm, with 0.25 mm film thickness) was used with nitrogen as a carrier gas (1 mL/min). The oven temperature was kept at 60°C for 10 min and programmed to 220°C at a rate of 4°C/min, then kept constant at 220°C for 10 min and then programmed to 240°C at a rate of 1°C/min. The injector temperature was at 250°C. The percentage compositions were obtained from electronic integration measurements using flame ionization detection (FID, 250°C). Alkanes were used as reference points in the calculation of relative retention indices (RRI). Relative percentages of the characterized components are listed in Table 1.

For gas chromatography/mass spectrometry a Hewlett-Packard GCD system was used. Innowax FSC column (60 m × 0.25 mm, 0.25 mm film thickness) was used with helium as a carrier gas. GC oven temperature was kept at 60°C for 10 min and programmed to 220°C at a rate of 4°C/min, and then kept constant at 220°C for 10 min and programmed to 240°C at a rate of 1°C/min. Split flow was adjusted at 50 mL/min. The injector temperature was at 250°C. MS were taken at 70 eV. Mass range was from *m/z* 35 to 425. Library search was carried out using the Wiley GC/MS Library and Baser Library of Essential Oil Constituents [3].

Eighty-five compounds representing 76.4% of the essential oil were characterized as listed in Table 1. Hexadecanoic acid (11.8%), caryophyllene oxide (9.8%) and spathulenol (5.8%) were the main components detected.

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

RRI	Compound	%	RRI	Compound	%
1093	Hexanal	0.5	1958	(E)-β-Ionone	0.7
1232	(E)-2-Hexenal	0.5	1973	Dodecanol	0.3
1244	2-Pentyl furan	0.2	1984	γ-Calacorene	0.3
1335	(E)-2-Heptenal	0.2	2001	Isocaryophyllene oxide	0.3
1348	6-Methyl-5-hepten-2-one	0.1	2008	Caryophyllene oxide	9.8
1360	Hexanol	0.2	2037	Salvial-4(14)-en-1-one	0.9
1391	(Z)-3-Hexenol	Tr.	2041	Pentadecanal	1.2
1400	Nonanal	0.3	2050	(E)-Nerolidol	0.1
1400	Tetradecane	Tr.	2071	Humulene epoxide-II	1.1
1416	3-Octen-2-one	0.1	2074	Caryophylla-2(12),6(13)-dien-5-one	0.1
1441	(E)-2-Octenal	0.2	2084	Octanoic acid	0.2
1452	1-Octen-3-ol	0.2	2104	Viridiflorol	0.3
1497	α-Copaene	0.6	2131	Hexahydrofarnesyl acetone	1.5
1500	Pentadecane	0.1	2144	Spathulenol	5.8
1506	Decanal	0.5	2179	3,4-Dimethyl-5-pentylidene-2(5H)-furanone	0.9
1516	(E)-Theaspirane	Tr.	2179	Tetradecanol	1.0
1535	β-Bourbonene	0.2	2192	Nonanoic acid	0.4
1541	Benzaldehyde	0.2	2209	T-Muurolol	0.5
1548	(E)-2-Nonenal	0.2	2247	*trans*-α-Bergamotol	0.4
1553	(Z)-Theaspirane	0.5	2257	β-Eudesmol	1.0
1553	Linalool	0.1	2262	Ethyl hexadecanoate (Ethyl palmitate)	0.5
1562	Octanol	0.1	2289	Oxo-α-ylangene	0.8
1573	(E,E)-3,5-Octadien-2-one	0.3	2298	Decanoic acid	1.3
1600	Hexadecane	0.6	2300	Tricosane	0.4
1602	6-Methyl-3,5-heptadien-2-one	0.2	2316	Caryophylla-2(12),6(13)-dien-5β-ol (Caryophylladienol I)	0.4
1612	β-Caryophyllene	0.1	2324	Caryophylla-2(12),6(13)-dien-5α-ol (Caryophylladienol II)	1.1
1617	Undecanal	0.1	2369	Eudesma-4(15),7-dien-4β-ol	0.2
1631	Hexyl tiglate	0.2	2389	Caryophylla-2(12),6-dien-5α-ol (Caryophyllenol I)	0.8
1638	β-Cyclocitral	0.3	2392	Caryophylla-2(12),6-dien-5β-ol (Caryophyllenol II)	1.1
1655	(E)-2-Decenal	0.5	2400	Tetracosane	0.9
1664	Nonanol	0.2	2500	Pentacosane	0.5
1681	(Z)-3-Hexenyl tiglate	0.1	2503	Dodecanoic acid	2.4
1715	(E,E)-2,4-Nonadienal	0.1	2600	Hexacosane	0.5
1722	Dodecanal	0.3	2617	Tridecanoic acid	0.4
1726	Germacrene D	0.4	2622	Phytol	0.4
1742	β-Selinene	3.2	2670	Tetradecanoic acid (Myristic acid)	3.1
1764	(E)-2-Undecenal	0.2	2700	Heptacosane	3.1
1830	Tridecanal	1.1	2800	Octacosane	Tr.
1838	(E)-β-Damascenone	0.2	2810	Benzyl salicylate	Tr.
1868	(E)-Geranyl acetone	0.5	2822	Pentadecanoic acid	1.4
1884	1-Methyl naphthalene	0.1	2900	Nonacosane	3.4
1933	Tetradecanal	0.2	2931	Hexadecanoic acid	11.8
1945	1,5-Epoxy-salvial(4)14-ene	1.2		**Total**	76.4

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

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