CONSTITUENTS OF THE ESSENTIAL OIL ZIZIPHORA TAURICA Subsp. CELONIOIDES (Boiss) P.H. Davis GROWING IN TURKEY

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SUMMARY: The analysis of the volatile components in the essential oil of ziziphora taurica subsp. cleonioides (Boiss) P. H. Davis (Lamiacea) by GLC, demonstrated the presence of at least 34 compounds; 28 of them were identified. The identified components represent about 82.26% of the oil. Major components found are pulegone (46.7%) and isomenthone (19.2%).

Key Words : Volatile oil, ziziphora taurica subsp. cleonioides, lamiaceae, pulegone.

INTRODUCTION

Ziziphora taurica has two subspecies which are *Z. taurica* subsp. *taurica* and *taurica* subsp. *cleonides.* As was known, Davis (1) has reported that *Z. taurica* subsp. *cleonioides* is endemic in Ödemis (Mesogis), province of Izmir but Kokkalou (2) has also reported that *Z. taurica* subsp. *cleonioides* has also been endemic in Mytylene. As it is seen, this coincidence may be normal since these regions are not far away from each other.

The use of the plant in the popular therapeutics of this region where, according to tradition, its tisane is used in the treatment of stomach aches and cold coughs and 'filiskin out' is the local name of this plant. Determination of the chemical structure of this type of plants (3-5) and identification of their morphological and anatomical properties (6-8) is the main research area of our department. As a result of this purpose we describe the analysis of the monoterpene hydrocarbon (MTHC) and oxygen containing monoterpene (OCMT) hydrocarbon fractions of the oil obtained on the herbs of the title plant, by means of gas-liquid chromatography (GLC).

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MATERIALS AND METHODS

1. Plant material

Z. taurica subsp. *cleonioides* were collected in June 1986 from the Bozdag (Mesogis) of Odemis, a near by town of Izmir. Aerial parts were dried at room temperature.

Isolation of the essential oil. The herbs were submitted to steam distillation for 3 h in a clevenger type apparatus. The isolated oil was dried over Na_2SO_4.

2. Liquid-solid chromatography

To prevent overlapping of the peaks and obtain optimum separation of the components by GLC, a column chromatography method (9-12) was used. According to this method, a glass column with a cooling (5-10°C) jacket (500x18 mm ID) was

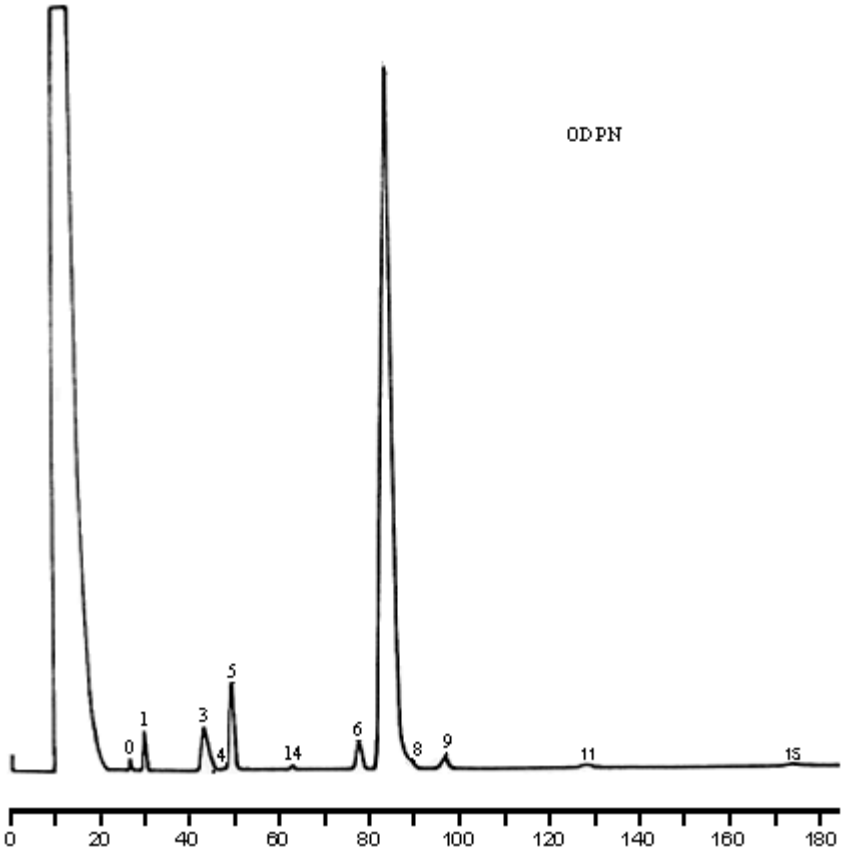

Figure 1: Gas Chromatogram of the MTHC Fraction of Z. taurica subsp. cleoniodes oil.

packed with a slurry of 40 g kieselgel 60 (Merck 7734) in pentane and 0.25 ml of the oil was chromatographed. The monoterpene hydrocarbon (MTHC) fraction was collected by using 314 ml n-pentane in 28 fractions.

To fractionate the oxygen containing monoterpenes (OCMT), 700 ml n-pentane-diethyl ether mixtures, changing in different ratios were used as eluents.

3. Gas-liquid chromatography

All the fractions were concentrated to 1 ml in a rotary evaporator under reduced pressure and 1 μl was chromatographed to Packard Becker Gas chromatograph Model 419. The systems used in the GLC analysis are tabulated in Table 1.

4. Identification of the compounds

The compounds were identified by comparing their retention times with those of authentic compounds as well as with other volatile oils, which were identified earlier, on the columns with different polarities. The percentages of the compounds were assigned by using planimtry.

RESULTS AND DISCUSSION

The aerial parts yielded 1.22% (V/W) of a clear, yellowish and strong pleasant odor essential oil which exhibited the following physical properties d^{25}: 0.0385, n^{25}: 1.4887.

GLC showed the presence of 34 components, 13 of them are found in MTHC mixture, which is 9.56% of the oil and the rest consisting 90.44%, are in OCMT fraction. The peak numbers, the names of the corresponding compounds and their percentages both in MTHC and OCMT fractions and in the oil, are listed in Tables 2 and 3. The chromatograms of the MTHC and the oil are shown in Figures 1 and 2 respectively.

As a result of this study, 82.26% of the oil has been determined and the major monoterpene hydrocarbon is

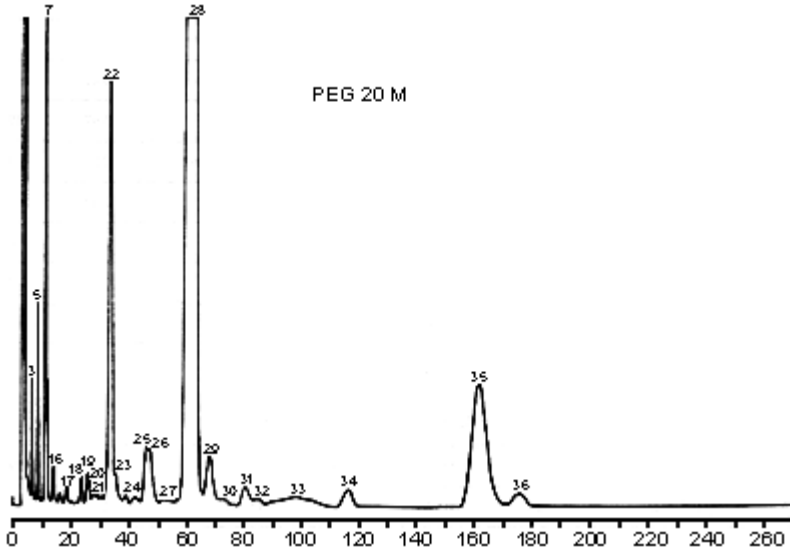

Figure 2: Gas chromatogram of the oil of *Z. taurica* subsp. *cleo niodes*.

limonene (5.97%) while pulegone (46.7%) and isomenthone (10.2%) are found to be the main components of the oxygen containing monoterpene hydrocarbons. When these results are compared with those reported in literature differs in

a)The absence of aliphatic hydrocarbons and naphthalene

b)The remarkable existence of monoterpenic hydrocarbons

c)The lower quantities of pulegone while those of limonene and menthone were found to be almost the same.

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Table 1: The systems used in GLC Analysis of the volatile oil (PEG20M:Polyethylene glycol; β, β' ODPN= Oxydipropionitril; SF 96; Silicon SF 96).

Systems	I	II	III	IV	V
Stationary Phase	PEG20M	β.β'ODPN	SF96	PEG20M	SF96
Solid Support		chromosorb	W-AW	860-80 Mesh)	
Column		Copper	800 X 1,5 mm I.D.		
Detector T °C	200	200	200	200	200
Injection Port T °C	200	200	200	200	200
Oven T °C	60	30	80	140	120
Carrier Gas (N_2) Flow	1.0	0.5	3	2	3
Chart Speed (min/cm)	5	5	5	5	5
Applied Fraction	MTHC	MTHC	MTHC	OCMT	OCMT

Table 2: Chemical composition of the MTHC fraction of *Ziziphora taurica* subsp. *cleoniodies* oil.

Peak No	Compounds	Oil (%)	MTHC (%)	Peak No	Compounds	Oil (%)	MTHC (%)
0	Trycylene	0.08	0.88	6	Myrcene	0.42	4.42
1	∝-pinene	0.50	5.36	7	Limonene	5.97	62.5
2	Camphene	0.02	0.25	8	β-phellandrene	0.25	3.57
3	β-pinene	0.76	8.03	9	γ-Terpinene	0.38	3.82
4	△ 4-carene	0.76	8.03	11	Terpinolene	0.08	0.80
5	Sabinene	0.85	8.93	15	p-cymene	0.08	0.80
14	∝-Rhellandrene	0.08	0.89				

Table 3: Chemical composition of the OCMT fraction of *Ziziphora taurica* subsp. *cleoniodies* oil.

Peak No	Compounds	Oil (%)	OCMT (%)	Peak No	Compounds	Oil (%)	OCMT (%)
16	1:8 Cineol	0.9	0.98	25	Unknown	2.2	2.5
17	Fenchone	0.9	0.98	26	Isopulegone	2.70	3.0
18	∝-Thujone	0.9	0.98	27	Menthole	0.6	0.64
19	β-Thujone	1.2	1.3	28	Pulegone	46.7	51.65
20	Unknown	0.14	0.15	29	∝-terpineol	4.2	4.5
21	Menthone	0.3	0.33	30	Borneol	0.88	0.98
22	Isomenthone	10.2	11.34	31	Piperitone	1.5	1.6
23	Linalool	0.3	0.33	32	Carvone	0.6	0.66
24	Mentylacetate	0.88	0.98	33-36	Unknowns	15.4	17.1

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