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COMPOSITION OF THE ESSENTIAL OIL OF *Ptilostemon gnaphaloides*

I. Djordjevic,[1] V. Tesevic,[2*] S. Milosavljevic,[3] N. Menkovic,[4] V. Vajs,[5] M. Jadranin, A. Jovanovic,[6] and Dejan Djokovic[7]

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The genus *Ptilostemon* comprises 23 species. *Ptilostemon gnaphaloides* (Cirillo) Sojak (syn. *Cirsium gnaphaloides*) (Asteraceae) is an endemic species growing in southeast Europe–Greece and Italy. The composition of the essential oil of *P. gnaphaloides* has previously not been investigated. Chemical constituents of the aerial parts or roots of some species of the genus *Ptilostemon* were reported elsewhere [1–6].

Plant material was collected during the flowering season in May 2006 in Porto Rafti, 30 km east of Athens, Greece. A voucher specimen (BEOU PTG052006) was deposited in the Herbarium of the Botanical Garden "Jevremovac," Faculty of Biology, University of Belgrade.

From fresh leaves and flowers (50 g) crude essential oil was obtained by 2 h-distillation-extraction in a Lickens-Nickerson apparatus. The volatiles were collected in CH_2Cl_2.

Gas chromatographic analysis was performed using an HP 5890 series II gas chromatograph equipped with a flame ionization detector (FID) and a split/splitless injector. The separation was achieved using an HP-5 (5% diphenyl and 95% dimethylpolysiloxane) fused silica capillary column, 30 m × 0.25 mm i.d., 0.25 μm film thickness. GC oven temperature was programmed from 50°C (6 min) to 285°C at a rate of 4.3°C/min. Hydrogen was used as carrier gas; flow rate: 1.6 mL/min at 45°C. Injector temperature: 250°C; detector temperature: 280°C. Injection mode: splitless. The injection volume was 1.0 μL.

Gas chromatographic-mass spectrometric (GC/MS) analysis was performed using an Agilent 6890 gas chromatograph coupled to an Agilent 5973 Network mass selective detector (MSD), in the positive ion electron impact (EI) mode. The separation was achieved using an Agilent 19091S-433 HP-5MS fused silica capillary column, 30 m × 0.25 mm i.d., 0.25 μm film thickness. GC oven temperature was programmed from 60°C to 285°C at a rate of 4.3°C/min. Helium was used as carrier gas; inlet pressure was 25 kPa; linear velocity: 1 mL/min at 210°C. Injector temperature: 250°C. Injection mode: splitless. MS scan conditions: source temperature, 200°C; interface temperature, 250°C; EI 70 eV; mass scan range, 40–350 amu. Identification of the components was based on retention indices and comparison of the mass spectra with those from the library (Wiley and NIST databases). Percentage (relative) of the identified compounds was computed from GC peak area.

Twenty-two compounds representing 93.32% of the essential oil were characterized as listed in Table 1. δ-Cadinene (25.72%) and β-caryophyllene (15.61%) were the main components.

1) Faculty for Veterinary Medicine, University of Belgrade, Bulevar Oslobodjenja 18, 11000 Belgrade, Serbia, fax: +381113615436, e-mail: iris@vet.bg.ac.yu; 2) Faculty of Chemistry, University of Belgrade, Studentski trg 16, 11001 Belgrade, Serbia, fax: +38111636061, e-mail: vtesevic@chem.bg.ac.yu; 3) Faculty of Chemistry, University of Belgrade, Studentski trg 16, 11001 Belgrade, Serbia, fax: +38111636061, e-mail: smilo@chem.bg.ac.yu; 4) Institute for Medicinal Plant Research, "Dr. Josif Pancic," Tadeusa Koscuska 1, 11000 Belgrade, Serbia, fax: +381113031650, e-mail: nmenkovic@iplb.co.yu; 5) Institute for Chemistry, Technology, and Metallurgy, Njegoseva 12, 11001 Belgrade, Serbia, fax: +381113235255, e-mail: vvajs@chem.bg.ac.yu; 6) Institute of Public Health, Despota Stefana 54a, 11000 Belgrade, Serbia, fax: +381113241212, e-mail: anka.jovanovic@zdravlje.org.yu; 7) Faculty of Chemistry, University of Belgrade, Studentski trg 16, 11001 Belgrade, Serbia, fax: +38111636061, e-mail: dejandj@chem.bg.ac.yu. Published in Khimiya Prirodnykh Soedinenii, No. 5, pp. 538-539, September-October, 2008. Original article submitted April 4, 2007.

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TABLE 1. Chemical Constituents of the Essential Oil of *P. gnaphaloides*

Compound	[a]RI	RT	%	Compound	[a]RI	RT	%
n-Decane	1000	5.08	0.88	α-Muurolene	1506	18.38	0.66
Benzeneacetaldehyde	1046	6.14	0.95	δ-Cadinene	1539	18.98	25.72
Nonanal	1103	7.78	2.29	α-Cadinene	1559	19.37	2.66
Methyl salicylate	1192	10.34	1.65	Caryophylene	1570	19.52	0.84
Decanal	1205	10.77	1.51	Ledol	1565	20.23	8.34
Undecanal	1306	13.89	5.17	Tridecanol	1577	20.38	0.79
α-Copaene	1392	15.81	0.94	Palmitic acid	1966	24.71	7.89
β-Bourbonene	1402	16.34	0.83	Tricosane	2300	31.76	5.30
β-Caryophyllene	1442	17.12	15.61	*n*-Heptacosane	2700	46.26	2.65
α-Patchulene	1462	17.39	1.74	*n*-Nonacosane	2900	49.61	2.34
Humulene	1480	17.84	0.75	Total			93.32
γ-Muurolene	1496	18.09	3.81				

[a]Retention index on HP-5 and according to *n*-paraffins.

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REFERENCES

1. F. Bohlmann and J. Ziesche, *Phytochemistry*, **19**, 692 (1980).
2. F. Bohlmann, N. Rao, and H. Schwarz, *Chem. Ber.*, **107**, 650 (1974).
3. F. Menichini, R. Di Benedetto, G. Delle Monache, and F. Delle Monache, *Fitoterapia*, **57**, 458 (1986).
4. M. Bruno, A. Maggio, M. Paternostro, S. Roselli, N. A. Arnold, and W. Herz, *Biochem. Syst. Ecol.*, **29**, 433 (2001).
5. P. Janackovic, V. Tesevic, P. D. Marin, S. M. Milosavljevic, B. Petkovic, and M. Sokovic, *Biochem. Syst. Ecol.*, **30**, 69 (2002).
6. F. Menichini, R. Di Benedetto, and F. Delle Monache, *Phytochemistry*, **41**, 1377 (1996).