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COMMUNICATION

Essential oil of *Myrrhidendron donnell-smithii* (Apiaceae)

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Resumen: Mediante hidrodestilación, se obtuvo el aceite esencial de las hojas de la planta *Myrrhidendron donnell-smithii* y se analizó utilizando cromatografía gaseoso-líquida y espectrometría de masas (CG-EM). Se observaron cerca de 65 señales de las cuales se identificaron 35 componentes que representan el 95.7% de la muestra. Los constituyentes identificados en el aceite representan un 1.8% de ésteres, 1.7% de alcoholes, 46.9% de monoterpenos, 37.0% de sesquiterpenos, 0.7% de aldehídos y un 7.6% de terpenos aromáticos.

Key words: *Myrrhidendron donnell-smithii,* Apiaceae, essential oil, phytochemistry, GC-MS.

Myrrhidendron donnell-smithii Coulter & Rose (Apiaceae) is a stout shrub, as much as 5 m tall. It is probably the tallest member of its family in Central and North America (Standley 1938). It belongs to a small genus (five species) distributed from Central America to Colombia (Mabberley 1987). The genus *Myrrhidendron* was established in 1894 with the description by Coulter and Rose of *M. donnell-smithii* from a collection made in Costa Rica, and included by Drude in 1898 among the Peucedeneae-Ferulinae (Peucedininae) (see Rodríguez 1957). A very complete study of the anatomy of this plant was made by Rodríguez (1957).

We have been able to isolate and characterize the following compounds: β-sitosterol, stigmasterol, vanillin, *p*-hidroxybenzaldehyde and the dihidrofuranocoumarins deltoin and marmesin isovalerate from the stem (Romero *et al.* 1991).

To our knowledge nothing has been reported concerning the composition of the essential oils of this genus.

The plant material was collected in July 1993 at Cerro de las Vueltas (Cerro de la Muerte), Costa Rica. A voucher specimen was deposited at the University of Costa Rica, School of Biology Herbarium (USJ 37204).

Freshly crushed leaves which gave off a strong musky odor were submited to hydrodistillation for 2 hr in a Clevenger type apparatus. The isolated oil was dried over anhydrous sodium sulfate; yield: 0.08% (v/w of fresh material) of transparent light yellow-green oil with a refraction index of 1.4183 (20°C) and a density of 0.863 g/ml (22°C).

The essential oil was subjected to a combined gas chromatographic-mass spectrometric analyses (GC-MS) with a Shimadzu QP-1100 EX instrument. The GC-MS data were obtained on a 5% Methylphenyl silicone Perkin-Elmer fused silica capillary column (50 m x 0.32 mm ID; film thickness 0.25 μm) installed in a Shimadzu GC-14A gas chromato-graph. The operating conditions were: carrier gas: helium with a linear flow rate of 32 cm/s; column oven temperature programming: 4 min at

75°C, 75-200°C at 2°C/min, and 8 min at 200°C; sample injection port temperature: 250°C; jet separator temperature: 250°C; ionization voltage: 70 eV; ionization current: 60 μA; scanning speed 0.6 s over 30-600 amu range; split injection system, 1:100.

By combination of GC-MS, it was possible to separate 35 main components (95.7% of the oil): 12 monoterpene hydrocarbons (46.9%); two hydroxylated monoterpenoids (1.5%); three aldehydes (0.7%), 10 sesquiterpene hydrocarbons (37.0%); one insaturated alcohol (0.2%), two aromatic compounds (7.6%); five methyl esters (1.8%) and 30 minor components not yet identified (4.3%).

The identification of the individual components was based on computer assisted comparison of the mass spectral data obtained with a collection of 54 000 standard mass spectra and by comparing their gas chromatographic retention times with those of authentic samples on same conditions.

The main components of the oil are the hydrocarbons α-pinene, β-pinene, sabinene, germacrene-D, *ar*-curcumene and α-zingiberene.

The names of the components, their relative retention times and the percentage of identified compounds of the total oil are given in Table 1.

TABLE 1

Identification of the main components of the essential oil of Myrrhidendron donnell-smithii

N°	R.T. (min)	B.P.	P.P.	Compound	Identification	Relative %
1	5.06	41	98	*(E)*-2-Hexenal	MS	0.5
2	5.12	41	100	3-Hexen-1-ol	MS	0.2
4	6.72	93	136	α-Thujene	MS	0.4
5	7.04	93	136	α-Pinene	MS+S	16.9
6	7.44	93	136	Camphene	MS+S	0.1
7	8.31	93	136	Sabinene	MS	6.8
8	8.51	93	136	β-Pinene	MS+S	8.9
9	8.80	41	136	β-Myrcene	MS+S	3.7
11	9.20	43	128	Octanal	MS+S	0.1
12	9.31	93	136	α-Phellandrene	MS	0.1
13	9.88	121	136	α-Terpinene	MS+S	3.2
14	10.25	119	134	*p*-Cymene	MS+S	2.6
15	10.43	68	136	Limonene	MS+S	4.5
17	11.09	93	136	α-Ocimene	MS+S	0.1
18	11.73	93	136	γ-Terpinene	MS	2.1
19	13.02	74	158	Methyl 6-methyloctanoate	MS	0.5
20	13.13	93	136	Terpinolene	MS	0.1
22	13.82	71	154	Linalool	MS+S	0.9
23	13.95	57	N/A	Aldehyde	MS	0.1
25	15.01	74	N/A	CAME	MS	0.1
26	18.31	71	154	4-Terpineol	MS+S	0.6
27	18.81	74	91	CAME	MS	0.2
28	19.13	74	115	CAME	MS	0.3
30	23.42	41	152	Methyl 3,7-dimethyl-6-octenoate	MS	0.7
36	31.45	81	204	β-Bourbonene	MS	0.5
38	31.95	81	204	β-Elemene	MS	0.2
39	33.85	41	204	β-Caryophyllene	MS+S	4.1
40	34.35	41	204	b-Eubebene	MS	0.4
41	34.75	93	204	α-Bergamotene	MS	0.2
42	35.96	93	204	α-Humulene	MS+S	1.1
43	38.24	41	204	Germacrene-D+		
	38.26	119	202	*ar*-Curcumene	MS	22.0
44	39.03	93	204	α -Zingiberene	MS	10.3
46	39.59	41	204	α-Farnesene	MS	0.9
48	40.55	69	204	β-Bisabolene	MS	2.3

Key: N° = elution order on the GC; R.T = retention time; B.P = base peak; P.P.= parent peak; MS= mass spectrometry; S= standard with the same R.T.; N/A= not available; CAME = carboxylic acid methyl ester.

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