

COMPOSITION OF THE ESSENTIAL OIL OF *Rhabdosciadium strausii* FROM IRAN

A. R. Fakhari,^{1,2} A. Sonboli,³ and R. Heydari¹

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The essential oil from the aerial parts of Rhabdosciadium strausii (Apiaceae) growing wild in Iran was obtained by hydrodistillation and analyzed by GC and GC-MS. Forty-two compounds were characterized, representing 97.5% of the total oil. β -Elemene (37.9%) and germacrene-D (32.2%) were identified as the major constituents.

Key words: *Rhabdosciadium strausii* (Apiaceae), essential oil composition, β -elemene, germacrene-D, Iran.

The genus *Rhabdosciadium* Boiss. belongs to the family Apiaceae and comprises three species in the flora of Iran [1]. *R. strausii* with the common persian name *Shalil* is an endemic species growing wild in Iran [2]. A literature survey revealed that the essential oil composition of *R. strausii* has not been the subject of previous investigations. Here, to the best of our knowledge, the chemical composition of the essential oil of *R. strausii* was studied for the first time.

The composition of the essential oil of *R. strausii* is reported in Table 1, where the compounds are listed in order of their elution on DB-1 column. The oil yield was 0.2% (w/w) based on the dry weight of plant. Forty-two constituents were identified, representing 97.5% of the total oil; 10 compounds are present in traces (<0.05%). Sesquiterpenoids constituted 92.7% of the oil, of which 80.9% are sesquiterpene hydrocarbons. Among sesquiterpene hydrocarbons, β -elemene and germacrene-D were found to be the main constituents, representing 37.9% and 32.2%, respectively. Oxygenated sesquiterpenes comprised 11.8% of the oil, with α -cadinol (2.6%) as the main constituent. Monoterpenes constituted 2.1% of total oil, of which 1.6% were monoterpene hydrocarbons with limonene (0.9%) as the main constituent. Linalool (0.5%) was the only oxygen-containing monoterpene present. Phytol (0.3%) was the only diterpene. Other compounds constituted 2.4% of total oil.

EXPERIMENTAL

Plant Material. Aerial parts of *Rhabdosciadium strausii* were collected at full flowering stage on July 14, 2004 from Iran: Lorestan, Oshorankuh Mountain, at an altitude of 2500 m. A voucher specimen (mp- 681) of plant has been deposited at the herbarium of Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Tehran, Iran.

Essential Oil Isolation. 100 g of air-dried aerial parts of plant was powdered and then subjected to hydrodistillation for 3 hours.

GC and GC-MS Analysis. The oil was analyzed by GC and GC-MS. GC analysis was performed using a Thermoquest gas chromatograph with a flame ionization detector (FID). The analysis was carried out using two different stationary phases in fused silica capillary columns (DB-1, 60 m \times 0.25 mm i.d.; film thickness 0.25 μ m; DB-Wax, 30 m \times 0.25 mm i.d.; film thickness 0.25 μ m).

1) Department of Chemistry, Faculty of Sciences, Shahid Beheshti University, Tehran, Iran, e-mail: a-zavareh@cc.sbu.ac.ir; afakhari@postoffice.utas.edu.au; 2) Department of Phytochemistry, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Evin, P.O. Box 19835-389, Tehran, Iran; 3) Department of Biology, Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, Evin, P.O. Box 19835-389, Tehran, Iran, e-mail: a-sonboli@cc.sbu.ac.ir. Published in Khimiya Prirodnikh Soedinenii, No. 4, pp. 333-334, July-August, 2005. Original article submitted January 12, 2005.

TABLE 1. Chemical Composition of the Essential Oil of *Rhabdosciadium strausii*

Compound	RI ¹	RI ²	%	Compound	RI ¹	RI ²	%
α -Pinene	939	1013	0.5	Germacrene-B	1567	-	1.8
β -Pinene	973	1096	Tr.	1,5-Epoxyvalial-4(14)-ene	1571	1883	0.7
Octanal	985	-	1.1	Spathulenol	1578	2124	1.0
α -Phellandrene	1005	1151	Tr.	Caryophyllene oxide	1585	1943	0.8
<i>p</i> -Cymene	1019	-	0.2	Salvial-4(14)-en-1-one	1593	1969	0.5
Limonene	1029	1186	0.9	Guaiol	1600	-	Tr.
Linalool	1088	1537	0.5	Cedrol	1615	-	Tr.
(E)-2-Decenal	1246	-	0.5	10- <i>epi</i> - γ Eudesmol	1624	-	Tr.
Anethole	1273	1802	0.4	Junipene	1639	-	0.6
α -Copaene	1385	1470	0.4	α -Cadinol	1654	-	2.6
β-Elemene	1400	1581	37.9	Isospathulenol	1667	-	1.6
β -Caryophyllene	1429	1570	1.5	Ledenoxide	1682	2269	Tr.
(E)- α -Bergamotene	1437	-	1.7	(Z-E)- α -Bergamotol	1703	-	1.7
Aromadendrene	1452	1733	0.2	(E)-Longipinocarveol	1721	2442	1.8
α -Humulene	1462	1642	0.3	Oplopenone	1761	-	0.6
Germacrene-D	1492	1690	32.2	Hexadecanol	1841	-	0.4
β -Selinene	1496	-	1.4	Phytol	2054	2510	0.3
Valencene	1498	-	Tr.				
α -Selinene	1504	1698	1.9	Monoterpene hydrocarbons			1.6
β -Bisabolene	1507	-	Tr.	Oxygenated monoterpenes			0.5
γ -Cadinene	1518	-	Tr.	Sesquiterpene hydrocarbons			80.9
δ -Cadinene	1525	-	0.7	Oxygenated sesquiterpenes			11.8
<i>cis</i> -Nerolidol	1536	-	Tr.	Other compounds			2.4
Isoaromadendrene epoxide	1556	-	0.5	Diterpene			0.3
β -Chamigrene	1561	2393	0.3	Total			97.5

¹Retention indices on DB-1 capillary column.

²Retention indices on DB-Wax capillary column.

Tr.: trace < 0.05%.

The operating conditions were as follows: injector and detector temperatures, 250°C and 300°C, respectively; nitrogen as a carrier gas at a flow rate of 1 ml/min; oven temperature programme, 60–250°C at the rate of 5°C/min, and finally held isothermally for 10 min. GC-MS analysis was performed by using a Thermoquest-Finnigan gas chromatograph equipped with the two above-mentioned columns and coupled to a TRACE mass quadrupole detector; helium as a carrier gas, ionization voltage 70 eV; ion source temperature, 200°C; interface temperature, 250°C. Mass range was from *m/z* 43–456. Gas chromatographic conditions were as given for GC.

Identification of the individual components of the oil was based on GC retention indices and computer matching of mass spectra with the Wiley 7 and NIST libraries of GC-MS system [3–5].

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