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The Volatile Leaf Oil of *Juniperus convallium* Rehd. & Wils. from Gansu, China

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ABSTRACT: The major components of the volatile leaf oil of *Juniperus convallium* Rehd. & Wils. were found to be α-pinene (47.6%), myrcene (8.4%), limonene (5.1%), abietadiene (4.7%), abietatriene (4.7%) and cubebol (3.3%). The oil is somewhat unusual in containing several cubebenes, cubebols and cubenols.

KEY WORD INDEX: *Juniperus convallium*, Cupressaceae, α-pinene, monoterpenes, sesquiterpenes, diterpenes.

PLANT NAME: *Juniperus convallium* Rehd. & Wils., common name: Mizhi, Yuan-bai (dense branch juniper).

SOURCE: Foliage was collected near Baiyun, Gansu (R. P. Adams, 6781-6783), and on the Duoer River, Gansu (R. P. Adams, 6785-6786). Voucher specimens are deposited at BAYLU and the Herbarium, Northwest Normal University.

PLANT PART: Fresh leaves were steam distilled in a circulatory Clevenger apparatus (1) for 2 h, oil yield was 1.5%.

PREVIOUS WORK: None.

PRESENT WORK: The components were identified by combined GC retention and ion trap mass spectroscopy (2). The oil is dominated by α-pinene (47.6%). Other major components are myrcene (8.4%), limonene (5.1%), abietadiene (4.7%), abietatriene (4.7%) and cubebol (3.3%) (Table I). It is somewhat unusual for *Juniperus* oils to contain several cubebenes, cubebols and cubenols. Two of the four unidentified compounds appear to be isomers of cubebene. A trace of cedrol was also found. The unknown diterpene (RT2717) is the same unknown reported in the oil of *J. przewalskii* (3).

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Table I. The steam volatile leaf oil of *Juniperus convallium* from Gansu, China (average from five trees)

RT	Compound	% Total oil
301	tricyclene	0.1
307	α-thujene	0.2
319	α-pinene	47.6
337	α-fenchene	t
340	camphene	0.4
347	thuja-2,4(10)-diene	t
379	sabinene	1.5
386	β-pinene	1.1
408	myrcene	8.4
427	δ-2-carene	t
435	α-phellandrene	0.1
444	δ-3-carene	t
457	α-terpinene	t
471	p-cymene	0.8
481	limonene	5.1
482	β-phellandrene	1.7
485	1,8-cineole	t
545	γ-terpinene	0.2
560	trans-sabinene hydrate	0.1
574	cis-linalool oxide (furanoid)	t
608	terpinolene	0.7
629	cis-sabinene hydrate	t
632	linalool	0.5
682	cis-p-menth-2-en-1-ol	0.1
692	α-campholenal	t
724	trans-p-menth-2-en-1-ol	0.2
735	trans-verbenol	0.2
789	borneol	t
820	terpinen-4-ol	0.2
852	α-terpineol	t
894	verbenone	0.1
1011	piperitone	t
1099	bornyl acetate	0.9
1101	linalool oxide acetate	t
1116	undecanone	0.2
1135	trans-pinocarvyl acetate	t
1195	a oxygenated aromatic $C_{11}H_{16}O$*	0.8
1267	α-cubebene	0.4
1334	α-copaene	t
1371	β-cubebene	0.8
1442	β-caryophyllene	0.1
1519	cubebene isomer*	0.9
1527	α-humulene	0.2
1577	(β-cadinene)	0.6
1584	germacrene isomer	0.2

Table I. (cont.)

RT	Compound	% Total oil
1594	germacrene D	0.4
1622	cubebene isomer*	2.4
1629	epi-cubebol	0.9
1643	α-muurolene	0.2
1679	cubebol	3.3
1695	cis-calamenene	t
1700	δ-cadinene	1.4
1720	cadina-1,4-diene (=cubenene)	0.3
1820	germacrene D-4-ol	0.3
1876	cedrol	t
1898	β-oplopenone	t
1942	1-epi-cubenol	1.9
1973	epi-α-cadinol (=τ-cadinol)	t
1977	cubenol	0.4
1984	torreyol (=δ-cadinol)	t
2003	α-cadinol	0.4
2660	epi-13-manool	0.2
2717	diterpene	1.6
2841	abietatriene	4.7
2891	abietadiene	4.7
2972	8-β-hydroxyisopimarene	0.4
3253	cis-totarol	0.3
3297	trans-totarol	0.7
3333	trans-ferruginol	t

Compounds are listed in order of their elution from a DB5 column.
Compounds in parenthesis are tentatively identified.
t = trace (<0.1%); unidentified components less than 0.5% are not reported.
* correct isomeric form not identified

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