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RESEARCH REPORT

Uruguayan Essential Oils. Part VII. Composition of Leaf Oil of *Eugenia uruguayensis* Camb. var. *uruguayensis* (Myrtaceae)

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Abstract

Eugenia uruguayensis leaf oil, obtained by hydrodistillation, was analyzed by GC and GC/MS. Sixty components were identified in the oil. The main components were limonene (17.6%), 1,8-cineole (17.0%), α-pinene (10.0%) and caryophyllene oxide (8.3%).

Key Word Index

Eugenia uruguayensis, Myrtaceae, essential oil composition, limonene, 1,8-cineole, α-pinene.

Introduction

Eugenia uruguayensis is an arbored plant about 6-15 m high. It blooms from November to February and its fruits ripen from October to December. It grows better in deep and humid soil, and it is present in the undergrowth of forests near the Rio Uruguay and its main tributaries. *E. uruguayensis* is widespread in Uruguay, Argentina, Paraguay and Brazil (1). The variety *uruguayensis* seems to be present only in Uruguay (2). The composition of leaf oil of *E. uruguayensis* var. *uruguayensis* is reported in this paper. To the best of our knowledge no previous studies have been reported on the composition of this oil.

Experimental

The fresh leaves of *E. uruguayensis* var. *uruguayensis* (known locally as Guayabo blanco) were collected near the Atlantic coast, around the Laguna de Rocha, Rocha Department, Uruguay, in October 1995. Voucher specimens (MVFQ 3523) have been preserved in the Herbarium of Institute of Botanica, Faculty of Chemistry, University of Montevideo, Uruguay. The leaves were air-dried and the oil was isolated by hydrodistillation using a modified Clevenger-type apparatus. *E. uruguayensis* leaf oil was analyzed by GC and GC/MS.

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Table I. Chemical composition of *Eugenia uruguayensis* oil

Peak no.	Compound	Percentage	Peak no.	Compound	Percentage
1	(Z)-3-hexenol	t	36	methyl thymol	0.1
2	hexanol	t	37	carvone	t
3	tricyclene	t	38	α-terpinyl acetate	0.1
4	α-thujene	1.3	39	α-copaene	t
5	α-pinene	10.0	40	geranyl acetate	0.1
6	camphene	0.1	41	α-gurjunene	t
7	sabinene	t	42	β-caryophyllene	1.6
8	β-pinene	3.1	43	β-gurjunene	0.1
9	6-methyl-5-hepten-2-one	t	44	aromadendrene	0.3
10	myrcene	0.9	45	α-humulene	0.3
11	p-mentha-1(7),8-diene	0.5	46	allo-aromadendrene	0.2
12	δ-3-carene	t	47	γ-himachalene	0.1
13	α-terpinene	0.1	48	β-selinene	0.7
14	p-cymene	1.9	49	α-selinene	0.6
15	limonene	17.6	50	butylated hydroxytoluene**	0.3
16	1,8-cineole	17.0	51	δ-cadinene	0.1
17	(Z)- β-ocimene	2.4	52	α-calacorene	0.1
18	(E)-β-ocimene	0.9	53	epi-longipinanol	0.4
19	γ-terpinene	4.2	54	longipinanol	0.3
20	cis-sabinene hydrate	t	55	spathulenol	1.2
21	terpinolene	0.6	56	caryophyllene oxide	8.3
22	linalool	0.2	57	guaiol	0.1
23	nonanal	0.1	58	humulene epoxide II	0.4
24	α-fenchol	t	59	1-epi-cubenol	0.9
25	cis-p-menth-2-en-1-ol	0.2	60	epi-α-cadinol	0.8
26	α-campholenal	t	61	selin-11-en-4α-ol	4.7
27	allo-ocimene*	t			
28	cis-limonene oxide	t		Monoterpene hydrocarbons	43.6
29	trans-pinocarveol	0.2		Sesquiterpene hydrocarbons	4.1
30	pinocarvone	0.1		Total hydrocarbons	47.7
31	terpinen-4-ol	3.3		Alcohols	16.5
32	p-cymen-8-ol	0.1		Esters	0.1
33	α-terpineol	4.2		Ethers and oxides	25.7
34	trans-piperitol	t		Total oxygenated compounds	42.7
35	trans-carveol	t		Total	90.4

*Correct isomer not identified; **Artifact

GC: Fisons chromatograph 5160 Mega Series equipped with a Shimadzu data processor C-R 3A; silica fused capillary column, 25 m x 0.32 mm, coated with SE-52, 0.40-0.45 μm film thickness (Mega, Legnano, Italy); column temperature, 45°C (6 min) to 240°C at 3°C/min; injector temperature 250°C; detector temperature 280°C; injection mode, split; split ratio 1:50; volume injected, 0.2 μL of the oil; carrier gas, He, 100 KPa.

GC/MS: Shimadzu QP 5000 equipped with Adams library (3), silica fused capillary column, 30 m x 0.25 mm coated with DB5, 0.25 μm film thickness (J & W, Folson, California, USA); column temperature, 60-240°C at 3°C/min; injector temperature, 250°C; injection mode, split; split ratio, 1:30; volume injected, 1.0 μL of the oil; carrier gas, He, 61.6 KPa; linear velocity 33.5 mL/min; interface temperature 250°C; detector 1.5 kV; acquisition mass range 41-300; solvent cut, 2 min.

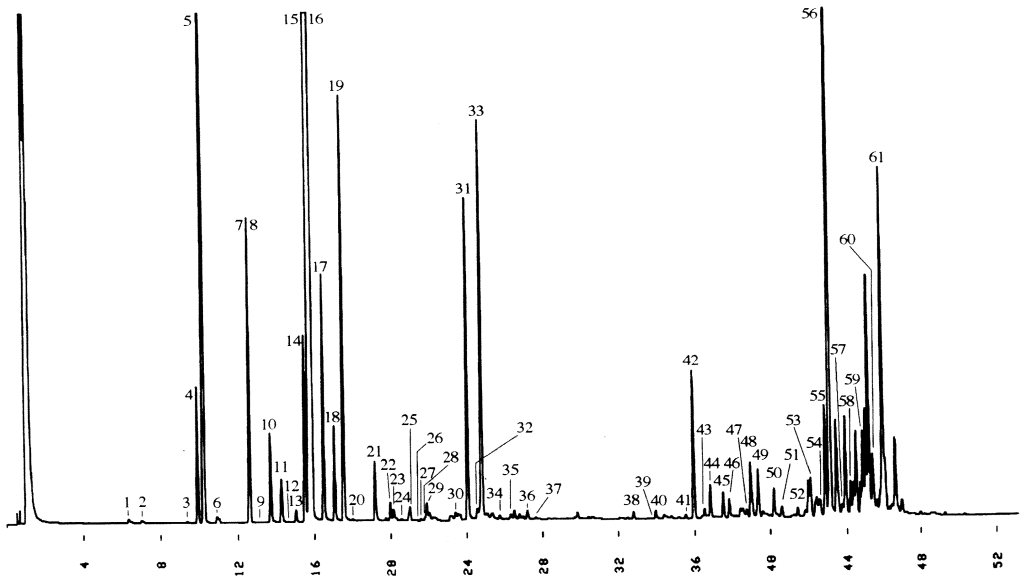

Figure 1. GC chromatogram of *Eugenia uruguayensis* leaf oil. For peak identifications see Table I

Results and Discussion

E. uruguayensis oil is pale yellow which has a slightly pungent odor. Table I gives the relative percentages of single components and classes of compounds of *E. uruguayensis* oil, while the chromatogram of this oil can be seen in Figure 1.

Figure 1 and Table I show the presence of 61 identified components which represents about 90% of the whole oil. Most of the unidentified components were sesquiterpene alcohols. The relative percentage of hydrocarbons was about 48%, while that of oxygenated compounds was about 42%.

Limonene (17.6%) was the main component. Among the other monoterpene hydrocarbons, a high proportion of α-pinene (10.0%), γ-terpinene (4.2%), β-pinene (3.1%) and (Z)-β-ocimene (2.4%) could also be found.

The sesquiterpene hydrocarbons fraction was qualitatively rich (12 components), and the main component was β-caryophyllene (1.6%). Among the oxygenated compounds 1,8-cineole (17.0%) and caryophyllene oxide (8.3%) were the main components. Alcohols were 16.5%; among these α-terpineol (4.2%) and terpinen-4-ol (3.3%) were the main monoterpene components, while spathulenol (1.2%) was the main sesquiterpene alcohol. Aldehydes were absent, and 6-methyl-5-hepten-2-one and carvone were the only ketones identified, and they were present as traces.

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