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## Eucalyptus Lemon Ironbark

### *Eucalyptus staigeriana*

Organically Produced, Australia

Batch #AU-58958

<b>Monoterpenes</b>	<b>40.4%</b>	<b>Monoterpenols</b>	<b>9.63%</b>	<b>Sesquiterpenes</b>	<b>1.01%</b>
α pinene	0.64	linalol	1.14	(Z)-jasmone	0.03
sabinene	0.35	cis-para-Menth-2-en-1-ol	0.23	β caryophyllene	0.35
β pinene	0.12	terpinen-4-ol	3.05	aromadendrene	0.05
myrcene	1.17	α terpineol	0.72	α humulene	0.04
α phellandrene	6.29	geraniol	4.4	viridiflorene	0.08
α terpinene	0.56	p-cymen-8-ol	0.09	bicyclogermacrene	0.18
limonene	5.49	cis-sabinene hydrate	0.01	γ-cadinene	0.02
β phellandrene	19.07	cis-linalol oxide	0.04	δ cadinene	0.08
γ terpinene	1.18	trans-linalol oxide	0.05		
trans β ocimene	0.55	trans-para-Mentha-2,8-dien-1-o	0.08	<b>Sesquiterpenols</b>	<b>1.15%</b>
para cymene	1.11	cis-para-Mentha-2,8-dien-1-ol	0.05	globulol	0.05
terpinolene	2.32	trans-para-Menth-2-en-1-ol	0.16	viridiflorol	0.03
cis β ocimene	0.19	α phellandren-8-ol	0.21	spathulenol	0.04
α thujene	1.27	β phellandren-8-ol	0.19	1-epi-cubenol	0.02
Δ3-carene	0.01	cis-piperitol	0.06	Guaia-6,10(14)-dien-4β-ol	0.04
paracymenene	0.06	trans-isopiperitenol	0.03		
allo-ocimene	0.02	trans-piperitol	0.07		
		cis-isopiperitenol	0.02		
		nerol	1.69		
		citronellol	0.3		
		(trans?)-6-hydroxypiperitone	0.01		
<b>Aldehydes</b>	<b>31.37%</b>	<b>Esters</b>	<b>10.45%</b>	<b>Ethers</b>	<b>1.09%</b>
isobutyral	0.06	neral formate	0.03	1,8 cineole	0.63
2-methylbutyral	0.01	trans-linalool oxide acetate	0.04	dehydro-1,8-cineole	0.26
(2E)-hexenal	0.01	methyl geranate	4.3	rosefuran	0.02
citronellal	0.08	citronellyl acetate	0.2	α phellandrene epoxide	0.04
isoneral	0.1	neral acetate	1.81	caryophellene oxide	0.02
isogeranial	0.24	geranyl acetate	3.84		
neral	13.19	geranyl formate	0.07		
geranial	17.68				
<b>Ketones</b>	<b>0.3%</b>	<b>Phenols</b>	<b>0.16%</b>	<b>Other</b>	<b>1.03%</b>
6-methyl-5-hepten-2-one	0.17	eugenol	0.16	ethanol	0.02
cryptone	0.13			2-methyl-3-buten-2-ol	0.02
				toluene	0.02
				(3Z)-hexenol	0.05
				6-Methyl-5-hepten-2-ol	0.01
				carvomenthene	0.02
				unknown	0.89

Raw Material: leaves

Production Method: Steam distillation

Date of analysis: 7/9/2019

Date : July 09, 2019

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

**Internal code :** 19G05-NGA01-1-SCC

**Customer identification :** Eucalyptus, Lemon Ironbark - Australia - AU-58958

**Type :** Essential oil

**Source :** *Eucalyptus staigeriana*

**Customer :** Nature's Gift Aromatherapy

ANALYSIS

**Method:** PC-PA-014 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.

**Analyst :** Alexis St-Gelais, M. Sc., chimiste

**Analysis date :** July 08, 2019

Checked and approved by :

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Alexis St-Gelais, M. Sc., chimiste 2013-174

*Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia. This report is digitally signed, it is only considered valid if the digital signature is intact. The results only describe the samples that were submitted to the assays.*

*PHYSICOCHEMICAL DATA*

**Physical aspect:** yellow liquid

**Refractive index:**  $1.4822 \pm 0.0003$  (20 °C)

*CONCLUSION*

No adulterant, contaminant or diluent has been detected using this method.

## ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Classe
Ethanol	0.02	Aliphatic alcohol
Isobutyral	0.06	Aliphatic aldehyde
2-Methyl-3-buten-2-ol	0.02	Aliphatic alcohol
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
Toluene	0.02	Simple phenolic
(2E)-Hexenal	0.01	Aliphatic aldehyde
(3Z)-Hexenol	0.05	Aliphatic alcohol
Hexanol	tr	Aliphatic alcohol
Isoamyl acetate	tr	Aliphatic ester
$\alpha$ -Thujene	1.27	Monoterpene
$\alpha$ -Pinene	0.64	Monoterpene
Camphene	tr	Monoterpene
Sabinene	0.35	Monoterpene
$\beta$ -Pinene	0.12	Monoterpene
6-Methyl-5-hepten-2-one	0.17	Aliphatic ketone
Dehydro-1,8-cineole	0.26	Monoterpenic ether
Myrcene	1.17	Monoterpene
6-Methyl-5-hepten-2-ol	0.01	Aliphatic alcohol
$\alpha$ -Phellandrene	6.29	Monoterpene
$\Delta^3$ -Carene	0.01	Monoterpene
$\alpha$ -Terpinene	0.56	Monoterpene
para-Cymene	1.11	Monoterpene
Carvomenthene	0.02	Aliphatic alcohol
Limonene	5.49	Monoterpene
$\beta$ -Phellandrene	19.07	Monoterpene
1,8-Cineole	0.63	Monoterpenic ether
(Z)- $\beta$ -Ocimene	0.19	Monoterpene
(E)- $\beta$ -Ocimene	0.55	Monoterpene
$\gamma$ -Terpinene	1.18	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.04	Monoterpenic alcohol
trans-Linalool oxide (fur.)	0.05	Monoterpenic alcohol
Terpinolene	2.32	Monoterpene
para-Cymenene	0.06	Monoterpene
Rosefuran	0.02	Monoterpenic ether
Linalool	1.14	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.23	Monoterpenic alcohol
trans-para-Mentha-2,8-dien-1-ol	0.08	Monoterpenic alcohol
allo-Ocimene	0.02	Monoterpene
cis-para-Mentha-2,8-dien-1-ol	0.05	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.16	Monoterpenic alcohol
Citronellal	0.08	Monoterpenic aldehyde
Isoneral	0.10	Monoterpenic aldehyde
$\alpha$ -Phellandren-8-ol	0.21	Monoterpenic alcohol
Unknown	0.12	Unknown
Terpinen-4-ol	3.05	Monoterpenic alcohol

Unknown	0.30	Oxygenated monoterpene
Cryptone	0.13	Normonoterpenic ketone
Isogeranial	0.24	Monoterpenic aldehyde
para-Cymen-8-ol	0.09	Monoterpenic alcohol
$\alpha$ -Terpineol	0.72	Monoterpenic alcohol
$\beta$ -Phellandren-8-ol	0.19	Monoterpenic alcohol
cis-Piperitol	0.06	Monoterpenic alcohol
trans-Isopiperitenol	0.03	Monoterpenic alcohol
$\alpha$ -Phellandrene epoxide	0.04	Monoterpenic ether
Unknown	0.15	Oxygenated monoterpene
trans-Piperitol	0.07	Monoterpenic alcohol
cis-Isopiperitenol	0.02	Monoterpenic alcohol
Nerol	1.69	Monoterpenic alcohol
Citronellol	0.30	Monoterpenic alcohol
Neral	13.19	Monoterpenic aldehyde
(Z)-Isogeraniol	0.03	Monoterpenic alcohol
Unknown	0.07	Unknown
Geraniol	4.40	Monoterpenic alcohol
Unknown	0.04	Unknown
Geranial	17.68	Monoterpenic aldehyde
Neryl formate	0.03	Monoterpenic ester
Unknown	0.07	Oxygenated monoterpene
trans-Linalool oxide acetate (pyr.)	0.04	Monoterpenic ester
Unknown	0.06	Unknown
Methyl geranate	4.30	Monoterpenic ester
Citronellyl acetate	0.20	Monoterpenic ester
Eugenol	0.16	Phenylpropanoid
Neryl acetate	1.81	Monoterpenic ester
Geranyl acetate	3.84	Monoterpenic ester
Unknown	0.03	Unknown
(Z)-Jasmone	0.03	Jasmonate
$\beta$ -Caryophyllene	0.35	Sesquiterpene
(trans?)-6-Hydroxypiperitone	0.01	Monoterpenic alcohol
Aromadendrene	0.05	Sesquiterpene
$\alpha$ -Humulene	0.04	Sesquiterpene
Unknown	0.03	Sesquiterpene
Viridiflorene	0.08	Sesquiterpene
Bicyclogermacrene	0.18	Sesquiterpene
$\gamma$ -Cadinene	0.02	Sesquiterpene
$\delta$ -Cadinene	0.08	Sesquiterpene
Spathulenol	0.04	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
Globulol	0.05	Sesquiterpenic alcohol
Viridiflorol	0.03	Sesquiterpenic alcohol
1-epi-Cubenol	0.02	Sesquiterpenic alcohol
Guaia-6,10(14)-dien-4 $\beta$ -ol	0.04	Sesquiterpenic alcohol
Unknown	0.02	Oxygenated sesquiterpene
Geranyl formate	0.07	Monoterpenic ester
<b>Consolidated total</b>	<b>98.18%</b>	

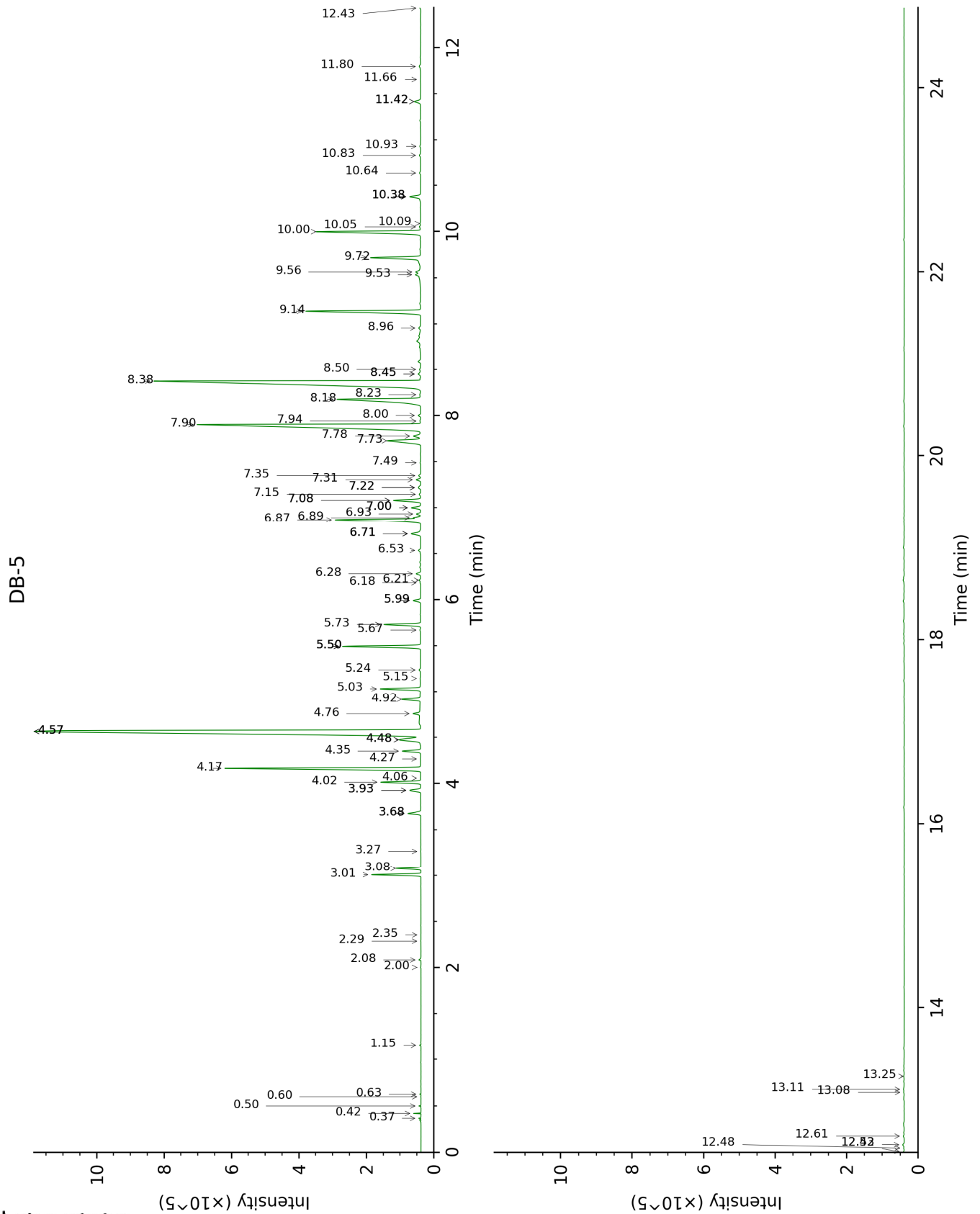
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

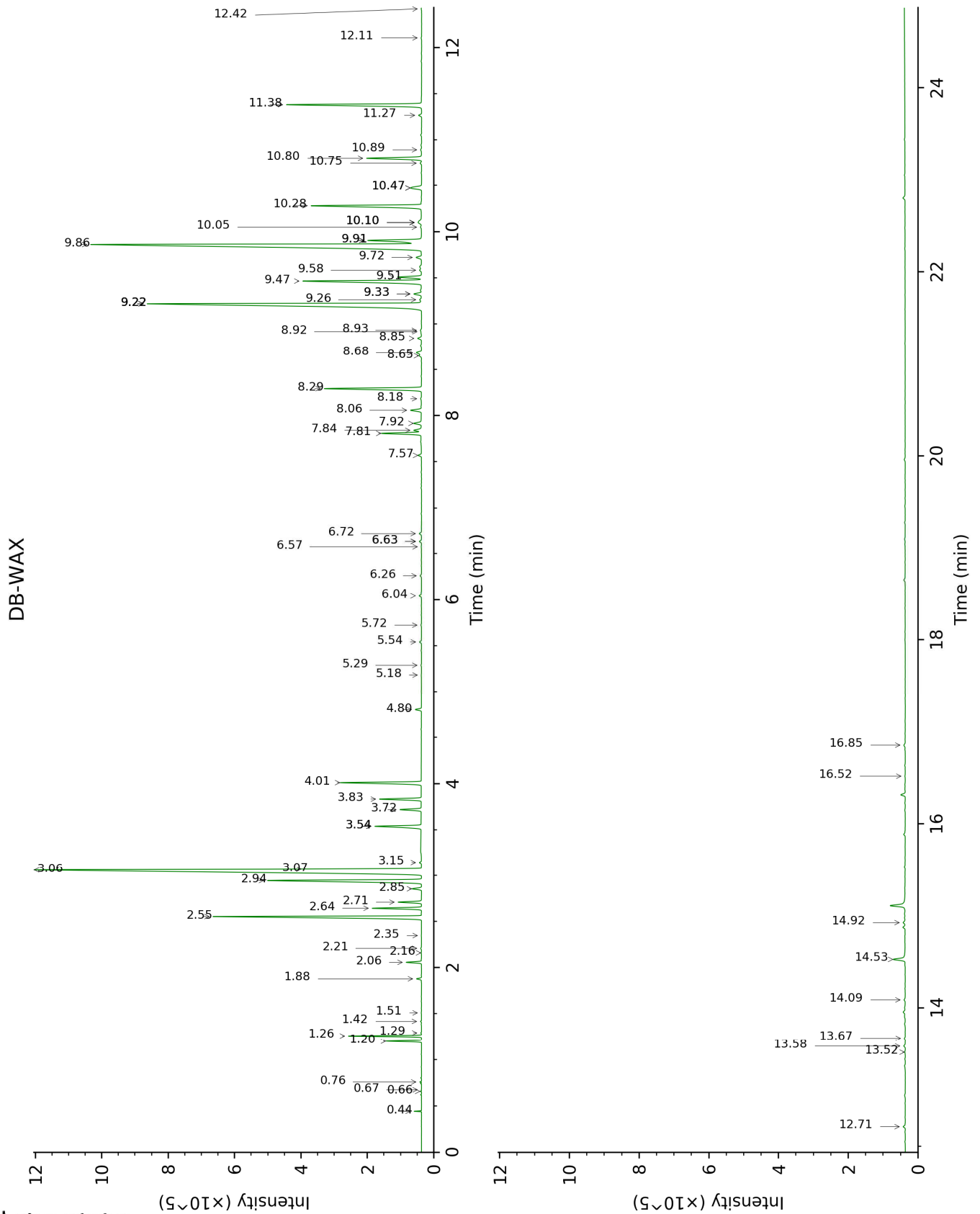
**About "consolidated" data:** The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm is set to prioritize data from the most standard DB-5 column, and smallest values so as to avoid overestimating individual content. This process is semi-automatic. Advanced users are invited to consult the "Full analysis data" table after the chromatograms in this report to access the full untreated data and perform their own calculations if needed.

**Unknowns:** Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

This page was intentionally left blank. The following pages present the complete data of the analysis.







FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Ethanol	0.37	517	0.02	0.76	910	0.02
Isobutyral	0.42	530	0.06	0.44	783	0.07
2-Methyl-3-buten-2-ol	0.50	590	0.02	1.42	1016	0.02
Isovaleral	0.60	640	tr	0.67	890	tr
2-Methylbutyral	0.63	651	0.01	0.66	883	0.01
Toluene	1.15	760	0.02	1.29	1003	0.01
(2E)-Hexenal	2.00	848	0.01	3.15	1175	0.05
(3Z)-Hexenol	2.08	855	0.05	5.54	1353	0.06
Hexanol	2.29	872	tr	5.18	1327	0.01
Isoamyl acetate	2.36	877	tr	2.16	1095	0.01
$\alpha$ -Thujene	3.01	925	1.27	1.26	1000	1.29
$\alpha$ -Pinene	3.08	930	0.64	1.20	991	0.65
Camphene	3.27	942	tr	1.51	1026	tr
Sabinene	3.68*	969	0.45	2.06	1084	0.35
$\beta$ -Pinene	3.68*	969	[0.45]	1.88	1065	0.12
6-Methyl-5-hepten-2-one	3.93*	986	0.43	4.80	1299	0.17
Dehydro-1,8-cineole	3.93*	986	[0.43]	2.86	1152	0.26
Myrcene	4.02	992	1.17	2.64	1135	1.19
6-Methyl-5-hepten-2-ol	4.06	994	0.01	6.57	1428	0.02
$\alpha$ -Phellandrene	4.17	1002	6.29	2.55	1127	6.30
$\Delta$ 3-Carene	4.27	1008	0.01	2.35	1111	0.01
$\alpha$ -Terpinene	4.35	1013	0.56	2.71	1140	0.57
para-Cymene	4.48*	1021	1.14	3.83	1229	1.11
Carvomenthene	4.48*	1021	[1.14]	2.21	1099	0.02
Limonene	4.57*	1027	25.08	2.94	1159	5.49
$\beta$ -Phellandrene	4.57*	1027	[25.08]	3.06	1168	19.07
1,8-Cineole	4.57*	1027	[25.08]	3.07	1169	0.63
(Z)- $\beta$ -Ocimene	4.76	1039	0.19	3.54*	1207	1.44
(E)- $\beta$ -Ocimene	4.92	1049	0.55	3.72	1220	0.56
$\gamma$ -Terpinene	5.03	1056	1.18	3.54*	1207	[1.44]
cis-Sabinene hydrate	5.15	1063	0.01	6.63*	1432	0.07
cis-Linalool oxide (fur.)	5.24	1069	0.04	6.26	1405	0.04
trans-Linalool oxide (fur.)	5.50*	1085	2.43	6.63*	1432	[0.07]
Terpinolene	5.50*	1085	[2.43]	4.01	1242	2.32
para-Cymenene	5.50*	1085	[2.43]	6.04	1389	0.06
Rosefuran	5.67	1097	0.02	5.72	1366	0.02
Linalool	5.73	1100	1.14	7.81	1521	1.14
cis-para-Menth-2-en-1-ol	5.99*	1117	0.26	7.84	1523	0.23
trans-para-Mentha-2,8-dien-	5.99*	1117	[0.26]	8.65	1586	0.08

1-ol						
allo-Ocimene	6.18	1130	0.02	5.29	1334	0.02
<i>cis</i> -para-Mentha-2,8-dien-1-ol	6.21	1132	0.05	9.22*	1632	13.15
<i>trans</i> -para-Menth-2-en-1-ol	6.28	1136	0.16	8.68	1589	0.19
Citronellal	6.53	1153	0.08	6.72	1438	0.08
Isoneral	6.72*	1164	0.43	7.57	1502	0.10
$\alpha$ -Phellandren-8-ol	6.72*	1164	[0.43]	9.91*	1687	2.02
Unknown [m/z 109, 95 (29), 110 (22), 81 (21), 79 (18), 91 (13)...]	6.72*	1164	[0.43]			
Terpinen-4-ol	6.87†	1175	3.35	8.29	1558	3.05
Unknown [m/z 84, 83 (74), 137 (56), 41 (47), 93 (43), 108 (40)... 152 (2)]	6.89†	1176	[3.35]	9.33*	1640	0.26
Cryptone	6.94	1179	0.13	8.84	1601	0.13
Isogeranial	7.00*	1183	0.34	7.92	1529	0.24
para-Cymen-8-ol	7.00*	1183	[0.34]	11.27	1803	0.09
$\alpha$ -Terpineol	7.08*	1188	0.94	9.51	1655	0.72
$\beta$ -Phellandren-8-ol	7.08*	1188	[0.94]	10.47*	1735	0.49
<i>cis</i> -Piperitol	7.15	1193	0.06	9.26	1635	0.07
<i>trans</i> -Isopiperitenol	7.22*	1198	0.11	10.05	1699	0.03
$\alpha$ -Phellandrene epoxide	7.22*	1198	[0.11]	10.75	1759	0.04
Unknown [m/z 84, 41 (83), 83 (79), 91 (76), 93 (67), 119 (64), 137 (63), 109 (54), 108 (54)... 152 (4)]	7.31	1203	0.15			
<i>trans</i> -Piperitol	7.35	1206	0.07	10.10*	1703	0.19
<i>cis</i> -Isopiperitenol	7.49	1216	0.02			
Nerol	7.73	1232	1.69	10.80	1763	1.70
Citronellol	7.78	1236	0.30	10.47*	1735	[0.49]
Neral	7.90	1244	13.19	9.22*	1632	[13.15]
( <i>Z</i> )-Isogeraniol	7.94	1247	0.03	10.90	1771	0.03
Unknown [m/z 43, 97 (55), 107 (44), 41 (38), 109 (32), 55 (27)...]	8.00	1251	0.07			
Geraniol	8.18	1263	4.40	11.38	1813	4.33
Unknown [m/z 109, 43 (83), 95 (70), 110 (70), 99 (53), 119 (48)...]	8.23	1267	0.04			
Geranial	8.38	1277	17.68	9.86	1684	17.39
Neryl formate	8.45*	1282	0.10	9.22*	1632	[13.15]
Unknown [m/z 43,	8.45*	1282	[0.10]	12.71	1932	0.07

69 (77), 41 (70), 109 (54)... 152 (6)] <i>trans</i> -Linalool oxide acetate (pyr.)	8.50	1286	0.04	8.92	1607	0.02
Unknown [m/z 111, 126 (93), 43 (90), 71 (60)...]	8.96	1312	0.06	14.92	2145	0.07
Methyl geranate	9.14	1325	4.30	9.47	1652	4.31
Citronellyl acetate	9.53	1353	0.20	9.22*	1632	[13.15]
Eugenol	9.56	1355	0.16	14.52	2105	0.41
Neryl acetate	9.72	1366	1.81	9.91*	1687	[2.02]
Geranyl acetate	10.00	1386	3.84	10.28	1719	3.75
Unknown [m/z 71, 100 (92), 111 (79), 69 (46), 109 (45)...]	10.05	1390	0.03	16.85	2346	0.05
( <i>Z</i> )-Jasmone	10.09	1392	0.03	12.11	1877	0.02
$\beta$ -Caryophyllene	10.38*	1413	0.46	8.06	1540	0.35
( <i>trans</i> ?) $\beta$ -6- Hydroxypiperitone	10.38*	1413	[0.46]	16.52	2310	0.01
Aromadendrene	10.64	1433	0.05	8.18	1550	0.03
$\alpha$ -Humulene	10.83	1448	0.04	8.93	1608	0.04
Unknown [m/z 161, 105 (56), 91 (50), 93 (36), 119 (33), 79 (31)...204 (5)]	10.93	1455	0.03			
Viridiflorene	11.42*	1491	0.26	9.33*	1640	[0.26]
Bicyclogermacrene	11.42*	1491	[0.26]	9.72	1672	0.18
$\gamma$ -Cadinene	11.66	1509	0.02	10.10*	1703	[0.19]
$\delta$ -Cadinene	11.80	1520	0.08	10.10*	1703	[0.19]
Spathulenol	12.43	1570	0.04	14.09	2062	0.05
Caryophyllene oxide	12.48	1574	0.02	12.42	1906	0.02
Globulol	12.52	1577	0.05	13.58	2014	0.05
Viridiflorol	12.61	1584	0.03	13.67	2022	0.03
1- <i>epi</i> -Cubenol	13.08	1622	0.02	13.52	2007	0.02
Guaia-6,10(14)- dien-4 $\beta$ -ol	13.11	1625	0.04			
Unknown [m/z 119, 121 (47), 93 (47), 91 (44), 105 (43), 95 (38), 109 (37)... 220 (3)]	13.25	1636	0.02			
Geranyl formate				9.58	1661	0.07
<b>Total identified</b>		<b>97.72%</b>			<b>97.17%</b>	
<b>Total reported</b>		<b>98.12%</b>			<b>97.37%</b>	

\*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total

†: Peaks apexes were resolved, but peaks overlapped and were summed for analysis

tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied  
R.T.: Retention time (minutes)

