

**Date :** December 17, 2020

**CERTIFICATE OF ANALYSIS – GC PROFILING**

**SAMPLE IDENTIFICATION**

**Internal code :** 20L03-PSC01

**Customer identification :** Moena - ENKR-2020-03

**Type :** Essential oil

**Source :** *Endlicheria krukovii*

**Customer :** Pacha Soap Co.

**ANALYSIS**

**Method:** PC-MAT-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 :** Sylvain Mercier, M. Sc., Chimiste

**Analysis date :** December 08, 2020

Checked and approved by :

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

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### PHYSICOCHEMICAL DATA

**Physical aspect:** Faintly yellow liquid

**Refractive index:**  $1.4820 \pm 0.0003$  (20 °C; method PC-MAT-016)

**Optical rotation:** 0.0° (21 °C, acetone,  $c = 0.4$ )

### 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	%	Class
Hexanal	0.01	Aliphatic aldehyde
Hexanol	tr	Aliphatic alcohol
3-Acetyl-3-methylcyclopentene	tr	Aliphatic ketone
Tricyclene	0.02	Monoterpene
$\alpha$ -Thujene	0.12	Monoterpene
$\alpha$ -Pinene	32.18	Monoterpene
Camphene	0.65	Monoterpene
$\alpha$ -Fenchene	0.04	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
$\beta$ -Pinene	26.72	Monoterpene
Sabinene	0.46	Monoterpene
Myrcene	1.99	Monoterpene
2-Carene	0.01	Monoterpene
$\alpha$ -Phellandrene	0.02	Monoterpene
Pseudolimonene	0.01	Monoterpene
$\Delta$ 3-Carene	0.03	Monoterpene
$\alpha$ -Terpinene	0.02	Monoterpene
para-Cymene	0.02	Monoterpene
Limonene	2.98	Monoterpene
1,8-Cineole	1.11	Monoterpenic ether
(Z)- $\beta$ -Ocimene	0.05	Monoterpene
(E)- $\beta$ -Ocimene	0.25	Monoterpene
$\gamma$ -Terpinene	0.04	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
Terpinolene	0.15	Monoterpene
$\alpha$ -Pinene oxide	0.01	Monoterpenic ether
Linalool	0.04	Monoterpenic alcohol
endo-Fenchol	0.01	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
$\alpha$ -Campholenal	0.01	Monoterpenic aldehyde
Nopinone	0.01	Normonoterpenic ketone
trans-Pinocarveol	0.07	Monoterpenic alcohol
cis-Verbenol	0.01	Monoterpenic alcohol
trans-Verbenol	0.05	Monoterpenic alcohol
Pinocarvone	0.02	Monoterpenic ketone
Isopinocampone	0.02	Monoterpenic ketone
Terpinen-4-ol	0.07	Monoterpenic alcohol
cis-Pinocarveol	0.01	Monoterpenic alcohol
Cryptone	0.01	Normonoterpenic ketone
para-Cymen-8-ol	0.01	Monoterpenic alcohol
Myrtenal	0.02	Monoterpenic aldehyde
$\alpha$ -Terpineol	0.10	Monoterpenic alcohol
Myrtenol	0.04	Monoterpenic alcohol
Verbenone	0.01	Monoterpenic ketone
Citronellol	0.01	Monoterpenic alcohol

Carvone	0.01	Monoterpenic ketone
δ-Elemene	0.09	Sesquiterpene
α-Cubebene	2.36	Sesquiterpene
Cyclosativene I	0.04	Sesquiterpene
Cyclosativene II	0.08	Sesquiterpene
α-Ylangene	tr	Sesquiterpene
Unknown	0.02	Sesquiterpene
α-Copaene	1.61	Sesquiterpene
β-Bourbonene	0.04	Sesquiterpene
cis-β-Elemene	0.08	Sesquiterpene
β-Cubebene	0.35	Sesquiterpene
β-Elemene	3.04	Sesquiterpene
Cyperene	0.09	Sesquiterpene
Ylanga-2,4(15)-diene?	0.01	Sesquiterpene
α-Gurjunene	0.11	Sesquiterpene
β-Caryophyllene	2.81	Sesquiterpene
cis-α-Bergamotene	0.09	Sesquiterpene
β-Ylangene	0.01	Sesquiterpene
γ-Maaliene	0.04	Sesquiterpene
β-Copaene	0.22	Sesquiterpene
γ-Elemene	0.02	Sesquiterpene
Aromadendrene	0.25	Sesquiterpene
trans-α-Bergamotene	0.02*	Sesquiterpene
α-Guaiene	[0.02]*	Sesquiterpene
1,2,2α,3,3,4,6,7,8,8α-Decahydro-2α,7,8-trimethylacenaphthylene	0.02	Sesquiterpene
trans-Muurolo-3,5-diene	0.10	Sesquiterpene
α-Humulene	0.49	Sesquiterpene
Rotundene	0.06	Sesquiterpene
Selina-4(15),7-diene	0.09	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
γ-Gurjunene	0.02	Sesquiterpene
Selina-4,11-diene	0.40	Sesquiterpene
Germacrene D	6.53	Sesquiterpene
γ-Muurolole	0.52	Sesquiterpene
β-Selinene	0.88	Sesquiterpene
allo-Aromadendr-9-ene	0.06	Sesquiterpene
γ-Amorphene	0.15	Sesquiterpene
Bicyclogermacrene	1.05	Sesquiterpene
Viridiflorene	0.07	Sesquiterpene
α-Selinene	0.61	Sesquiterpene
epi-Cubebol	0.23	Sesquiterpenic alcohol
α-Muurolole	0.36	Sesquiterpene
Germacrene A	0.86	Sesquiterpene
γ-Cadinene	0.37	Sesquiterpene
Cubebol	0.28	Sesquiterpenic alcohol
δ-Cadinene	1.74	Sesquiterpene
trans-Calamenene	0.11	Sesquiterpene
trans-Cadina-1,4-diene	0.12	Sesquiterpene
α-Cadinene	0.06	Sesquiterpene
α-Calacorene	0.07	Sesquiterpene
α-Elemol	0.09	Sesquiterpenic alcohol

Germacrene B	0.22	Sesquiterpene
1,5-Epoxyxysalvial-4(14)-ene	0.03	Sesquiterpenic ether
(E)-Nerolidol	0.07	Sesquiterpenic alcohol
Spathulenol	0.50	Sesquiterpenic alcohol
Caryophyllene oxide	0.27	Sesquiterpenic ether
Caryophyllene oxide isomer	0.03	Sesquiterpenic ether
Globulol	0.08	Sesquiterpenic alcohol
Viridiflorol	0.11	Sesquiterpenic alcohol
Guaiol	0.47	Sesquiterpenic alcohol
Copaborneol	0.05	Sesquiterpenic alcohol
Humulene epoxide II	0.06	Sesquiterpenic ether
Junenol	0.10	Sesquiterpenic alcohol
Unknown	0.06	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
$\alpha$ -Corocalene	0.04	Sesquiterpene
1-epi-Cubenol	0.15	Sesquiterpenic alcohol
Isospathulenol	0.08	Sesquiterpenic alcohol
Unknown	tr	Unknown
$\tau$ -Cadinol	0.09	Sesquiterpenic alcohol
$\tau$ -Muurolol	0.11	Sesquiterpenic alcohol
$\alpha$ -Muurolol	0.17	Sesquiterpenic alcohol
$\alpha$ -Cadinol	0.16	Sesquiterpenic alcohol
Selin-11-en-4 $\alpha$ -ol	0.09	Sesquiterpenic alcohol
(E)-Isoelemicin	0.02	Phenylpropanoid
cis-Calamenen-10-ol	0.04	Sesquiterpenic alcohol
trans-Calamenen-10-ol	0.05	Sesquiterpenic alcohol
Unknown	0.05	Unknown
Bulnesol	0.11	Sesquiterpenic alcohol
Cadalene	0.04	Sesquiterpene
Germacra-4(15),5,10(14)-trien-1 $\alpha$ -ol	0.04	Sesquiterpenic alcohol
Unknown	0.01	Lignan
Patchoulenone	0.01	Sesquiterpenic ketone
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
<b>Consolidated total</b>	<b>97.58%</b>	

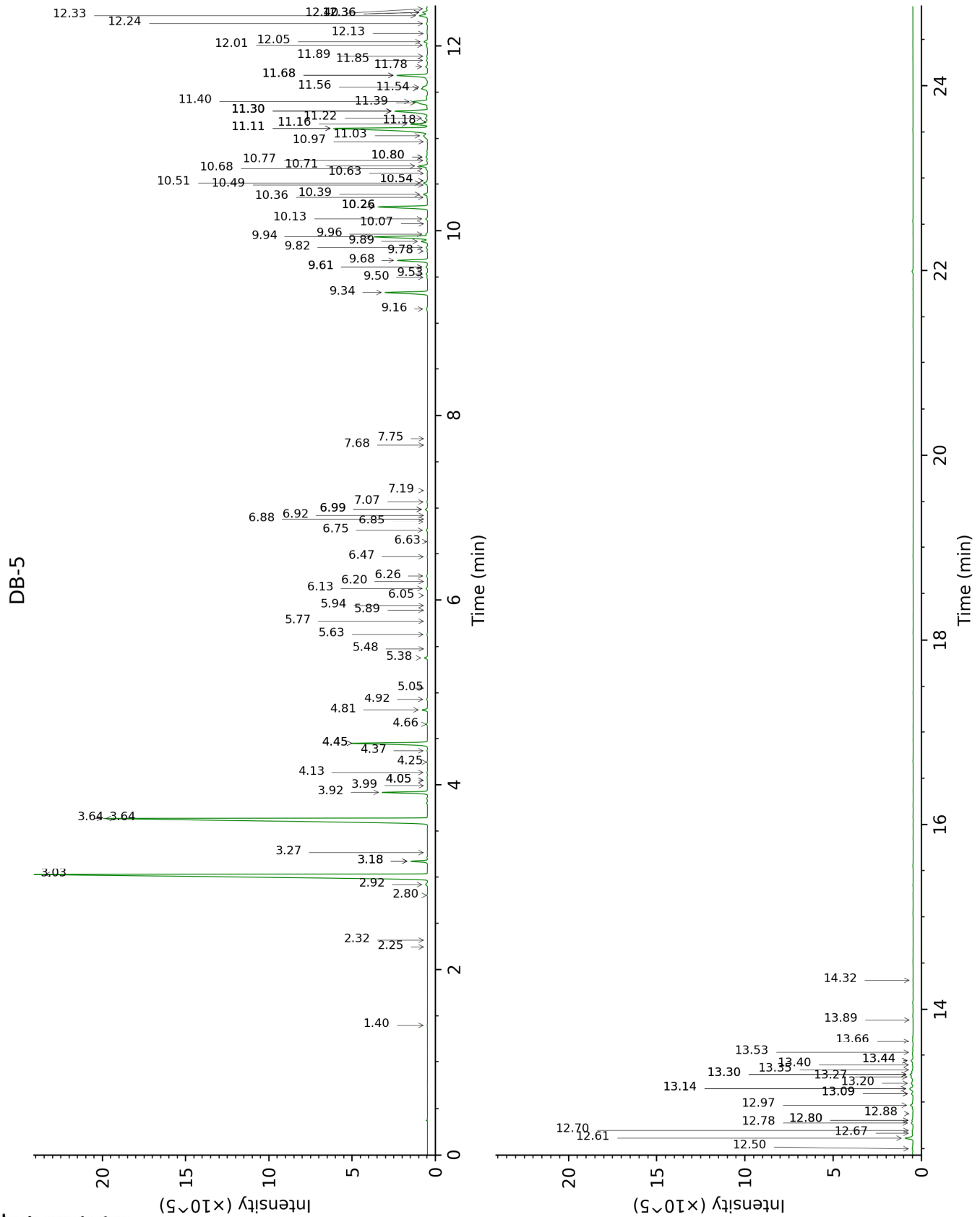
\*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered  
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total  
tr: The compound has been detected below 0.005% of total signal.

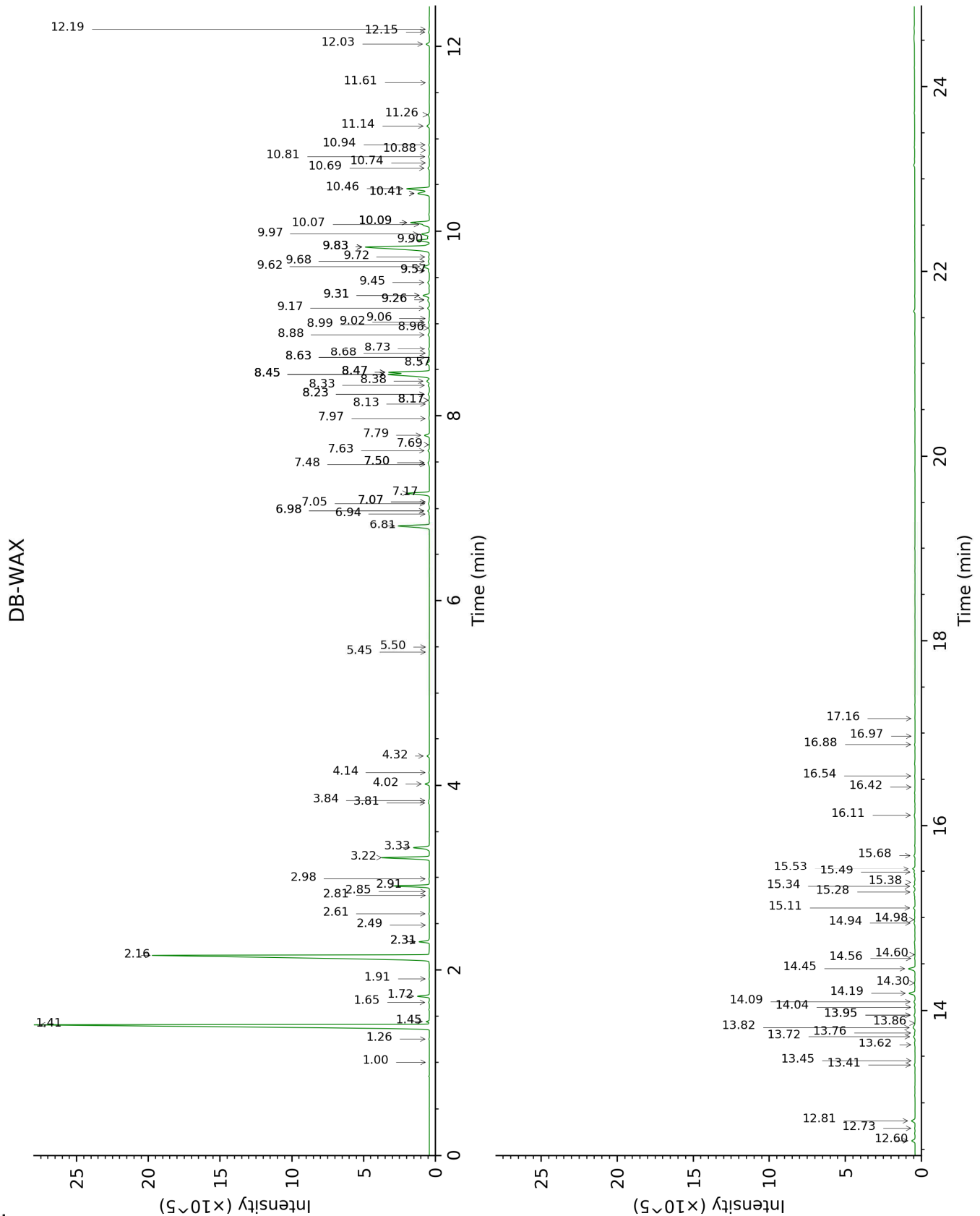
Note: no correction factor was applied

**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	%
Hexanal	1.40	804	0.01	1.91	1044	0.02
Hexanol	2.25	876	tr	5.50	1324	0.01
3-Acetyl-3-methylcyclopentene	2.32	882	tr	1.00	928	tr
Tricyclene	2.80	918	0.02	1.26	970	0.02
$\alpha$ -Thujene	2.92	926	0.12	1.45	998	0.13
$\alpha$ -Pinene	3.03	933	32.18	1.41	994	32.04
Camphene	3.18*	943	0.68	1.72	1025	0.65
$\alpha$ -Fenchene	3.18*	943	[0.68]	1.65	1019	0.04
Thuja-2,4(10)-diene	3.27	949	0.01	2.31*	1084	0.58
$\beta$ -Pinene	3.64*	974	27.18	2.16	1069	26.72
Sabinene	3.64*	974	[27.18]	2.31*	1084	[0.58]
Myrcene	3.92	992	1.99	2.91	1133	2.01
2-Carene	3.99	997	0.01	2.49	1100	0.01
$\alpha$ -Phellandrene	4.05*	1001	0.02	2.81	1125	0.02
Pseudolimonene	4.05*	1001	[0.02]	2.85	1128	0.01
$\Delta^3$ -Carene	4.14	1006	0.03	2.61	1110	0.03
$\alpha$ -Terpinene	4.25	1014	0.02	2.98	1139	0.03
para-Cymene	4.37	1021	0.02	4.14	1227	0.03
Limonene	4.45*	1026	4.08	3.22	1158	2.98
1,8-Cineole	4.45*	1026	[4.08]	3.33	1166	1.11
(Z)- $\beta$ -Ocimene	4.66	1039	0.05	3.84	1205	0.04
(E)- $\beta$ -Ocimene	4.81	1049	0.25	4.02	1218	0.26
$\gamma$ -Terpinene	4.92	1056	0.04	3.81	1203	0.05
cis-Sabinene hydrate	5.05	1064	0.01	6.94	1429	0.04
Terpinolene	5.38	1085	0.15	4.32	1240	0.15
$\alpha$ -Pinene oxide	5.48	1091	0.01	5.45	1320	0.01
Linalool	5.63	1101	0.04	8.17*	1521	0.05
endo-Fenchol	5.77	1110	0.01	8.45*†	1542	5.85
cis-para-Menth-2-en-1-ol	5.89	1117	0.01	8.13	1518	0.02
$\alpha$ -Campholenal	5.94	1121	0.01	7.07*	1439	0.02
Nopinone	6.05	1128	0.01	8.23*	1526	0.10
trans-Pinocarveol	6.13	1132	0.07	9.26*	1606	0.18
cis-Verbenol	6.20	1137	0.01	9.31*	1610	0.49
trans-Verbenol	6.26	1141	0.05	9.57*	1631	0.09
Pinocarpone	6.47	1155	0.02	7.97	1506	0.02
Isopinocampone	6.63	1165	0.02	7.69	1484	0.01
Terpinen-4-ol	6.76	1173	0.07	8.63*	1557	0.09
cis-Pinocarveol	6.85	1179	0.01	10.88	1738	0.01
Cryptone	6.88	1182	0.01	9.26*	1606	[0.18]
para-Cymen-8-ol	6.92	1184	0.01	11.61	1800	0.02
Myrtenal	6.99*	1188	0.12	8.68	1560	0.02
$\alpha$ -Terpineol	6.99*	1188	[0.12]	9.83*	1652	6.79
Myrtenol	7.07	1194	0.04	10.94	1743	0.04
Verbenone	7.19	1202	0.01	9.68	1639	0.11
Citronellol	7.68	1235	0.01	10.74	1727	0.01
Carvone	7.75	1240	0.01	10.07	1671	0.37
$\delta$ -Elemene	9.16	1333	0.09	6.98*	1432	0.11

$\alpha$ -Cubebene	9.34	1345	2.36	6.81	1419	2.33
Cyclosativene I	9.50	1357	0.04	6.98*	1432	[0.11]
Cyclosativene II	9.53	1360	0.08	7.05	1437	0.08
$\alpha$ -Ylangene	9.61*	1365	0.10	7.07*	1439	[0.02]
Unknown [m/z 189, 91 (89), 82 (78), 109 (72), 93 (68), 67 (63), 161 (59)... 204 (tr)]	9.61*	1365	[0.10]	7.50*	1470	0.12
$\alpha$ -Copaene	9.68	1370	1.61	7.17	1446	1.60
$\beta$ -Bourbonene	9.78	1377	0.04	7.48	1469	0.03
<i>cis</i> - $\beta$ -Elemene	9.82	1380	0.08	8.33	1534	0.09
$\beta$ -Cubebene	9.89	1385	0.35	7.79	1492	0.34
$\beta$ -Elemene	9.94	1388	3.04	8.45*†	1542	[5.85]
Cyperene	9.96	1390	0.09	7.50*	1470	[0.12]
Ylanga-2,4(15)-diene?	10.08	1398	0.01	8.63*	1557	[0.09]
$\alpha$ -Gurjunene	10.13	1402	0.11	7.63	1480	0.10
$\beta$ -Caryophyllene	10.26*	1412	2.92	8.47*†	1544	[5.85]
<i>cis</i> - $\alpha$ -Bergamotene	10.26*	1412	[2.92]	8.23*	1526	[0.10]
$\beta$ -Ylangene	10.26*	1412	[2.92]	8.17*	1521	[0.05]
$\gamma$ -Maaliene	10.36	1419	0.04	8.45*†	1542	[5.85]
$\beta$ -Copaene	10.39	1422	0.22	8.38	1537	0.22
$\gamma$ -Elemene	10.49	1429	0.02	9.06	1590	0.02
Aromadendrene	10.51	1431	0.25	8.57	1552	0.23
<i>trans</i> - $\alpha$ -Bergamotene	10.54*	1433	0.02	8.47*†	1544	[5.85]
$\alpha$ -Guaiene	10.54*	1433	[0.02]	8.47*†	1544	[5.85]
1,2,2 $\alpha$ ,3,3,4,6,7,8,8 $\alpha$ -Decahydro-2 $\alpha$ ,7,8-trimethylacenaphthylene	10.63	1439	0.02	8.73	1564	0.07
<i>trans</i> -Muurolo-3,5-diene	10.68	1443	0.10	8.88	1576	0.11
$\alpha$ -Humulene	10.71	1445	0.49	9.31*	1610	[0.49]
Rotundene	10.77	1450	0.06	8.96	1582	0.06
Selina-4(15),7-diene	10.80*	1452	0.11	9.02	1586	0.09
allo-Aromadendrene	10.80*	1452	[0.11]	8.99	1584	0.01
$\gamma$ -Gurjunene	10.97	1465	0.02	9.17	1598	0.13
Selina-4,11-diene	11.03	1470	0.40	9.45	1621	0.14
Germacrene D	11.11*	1476	7.05	9.83*	1652	[6.79]
$\gamma$ -Muurolole	11.11*	1476	[7.05]	9.62	1635	0.52
$\beta$ -Selinene	11.16	1479	0.88	9.90	1658	0.86
allo-Aromadendr-9-ene	11.18	1481	0.06	9.57*	1631	[0.09]
$\gamma$ -Amorphene	11.22	1484	0.15	9.83*	1652	[6.79]
Bicyclgermacrene	11.30*	1490	2.30	10.09*	1673	1.41
Viridiflorene	11.30*	1490	[2.30]	9.72	1643	0.07
$\alpha$ -Selinene	11.30*	1490	[2.30]	9.97	1663	0.61
epi-Cubebol	11.30*	1490	[2.30]	12.03	1837	0.23
$\alpha$ -Muurolole	11.39	1496	0.36	10.09*	1673	[1.41]
Germacrene A	11.40	1497	0.86	10.41*	1699	1.09
$\gamma$ -Cadinene	11.54	1508	0.37	10.41*	1699	[1.09]
Cubebol	11.56	1509	0.28	12.60	1887	0.24
$\delta$ -Cadinene	11.68*	1519	1.90	10.46	1703	1.74
<i>trans</i> -Calamenene	11.68*	1519	[1.90]	11.26	1771	0.11
<i>trans</i> -Cadina-1,4-diene	11.78	1527	0.12	10.69	1722	0.10
$\alpha$ -Cadinene	11.84	1532	0.06	10.81	1733	0.06

α-Calacorene	11.89	1536	0.07	12.16	1848	0.07
α-Elemol	12.01	1545	0.09	14.09	2026	0.08
Germacrene B	12.05	1548	0.22	11.14	1760	0.18
1,5-Epoxysalvial-4(14)-ene	12.14	1555	0.03	12.19	1851	0.02
(E)-Nerolidol	12.24	1563	0.07	13.86	2004	0.01
Spathulenol	12.33	1570	0.50	14.45	2060	0.50
Caryophyllene oxide	12.36*	1573	0.30	12.81	1906	0.27
Caryophyllene oxide isomer	12.36*	1573	[0.30]	12.73	1899	0.03
Globulol	12.40	1576	0.08	13.95*	2012	0.08
Viridiflorol	12.50	1584	0.11	14.04	2020	0.04
Guaiol	12.61	1592	0.47	14.19	2034	0.45
Copaborneol	12.67	1597	0.05	14.98	2111	0.06
Humulene epoxide II	12.70	1599	0.06	13.41	1961	0.06
Junenol	12.78	1606	0.10	13.72	1990	0.13
Unknown [m/z 151, 41 (15), 81 (13), 111 (13), 91 (13)...]	12.80*	1608	0.11	14.30	2045	0.06
Unknown [m/z 43, 81 (81), 109 (68), 41 (68), 67 (64), 135 (63), 161 (62)... 204 (50), 208 (50)... 236 (12)]	12.80*	1608	[0.11]	14.60	2074	0.01
α-Corocalene	12.88	1614	0.04	13.76	1994	0.04
1-epi-Cubenol	12.97	1621	0.15	13.82	1999	0.21
Isospathulenol	13.09*	1631	0.10	15.49	2162	0.08
Unknown [m/z 43, 93 (89), 91 (88), 79 (87), 123 (76), 81 (75)...]	13.09*	1631	[0.10]	13.95*	2012	[0.08]
τ-Cadinol	13.14*	1636	0.28	14.94	2108	0.09
τ-Muurolol	13.14*	1636	[0.28]	15.11	2124	0.11
α-Muurolol	13.20	1641	0.17	15.28	2141	0.10
α-Cadinol	13.27	1646	0.16	15.53	2166	0.23
Selin-11-en-4α-ol	13.30*	1648	0.18	15.68	2180	0.09
(E)-Isoelemicin	13.30*	1648	[0.18]	17.16	2334	0.02
cis-Calamenen-10-ol	13.34	1653	0.04	16.54	2268	0.04
trans-Calamenen-10-ol	13.40	1657	0.05	16.88	2304	0.04
Unknown [m/z 81, 41 (46), 79 (46), 93 (39), 91 (33), 107 (33)... 206 (8)]	13.44*	1661	0.15			
Bulnesol	13.44*	1661	[0.15]	15.34	2147	0.11
Cadalene	13.53	1668	0.04	15.38	2151	0.05
Germacra-4(15),5,10(14)-trien-1α-ol	13.66	1678	0.04	16.11	2225	0.08
Unknown [m/z 133, 93 (97), 131 (85), 145 (83), 107 (69)...220]	13.89	1698	0.01	16.97	2314	0.01
Patchoulone	14.32	1734	0.01	16.42	2256	0.01
Unknown [m/z 119, 43 (73), 91 (64), 147 (64),				13.45	1965	0.01

105 (59), 162 (58), 93 (54), 107 (41)... 220 (10)] Unknown [m/z 108, 107 (100), 43 (92), 91 (91), 93 (90), 159 (84), 119 (71), 121 (70)... 220 (5)]		13.62	1981	0.02
Unknown [m/z 121, 93 (91), 135 (86), 81 (83), 159 (74), 91 (72)... 220 (8)]		14.56	2070	0.03
<b>Total identified</b>	<b>98.11%</b>	<b>97.48%</b>		
<b>Total reported</b>	<b>98.12%</b>	<b>97.63%</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)

R.I.: Retention index