

Date : 2026-01-29

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

**Internal code :** 25K07-PTH13

**Customer Identification :** Thyme Thymol - Turkey - T40115R

**Type :** Essential Oil

**Source :** *Thymus vulgaris* ct. *Thymol*

**Customer :** Plant Therapy

Checked and approved by:

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Sylvain Mercier, M. Sc., Chimiste 2014-005

*Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The compliance status of the sample is provided to facilitate the reading of the report. The client remains ultimately responsible for reviewing the results presented within this report and to establish compliance of the tested batch against relevant quality criteria.*

*This report is an update of the version first issued on 2025-11-14 to make a correction in the sample identification section.*

## GAS CHROMATOGRAPHIC ANALYSIS

**Method :** PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

**\*ISO**

**Results :** See analysis summary (next page)

**Analyst :** Jean-Christophe Fortin, M. Sc.

**Date :** 2025-11-14

## PHYSICOCHEMICAL DATA

**Refractive index :**  $1.5026 \pm 0.0003$  (20 °C)

**Method :** PC-MAT-016 - Measure of the refractive index of a liquid.

**Analyst :** Cindy Caron B. Sc.

**Date :** 2025-11-07

## 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
Isobutyral	tr	Aliphatic aldehyde
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
3-Methyl-3-butenol	0.02	Aliphatic alcohol
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Ethyl isobutyrate	0.01	Aliphatic ester
Methyl 2-methylbutyrate	0.07	Aliphatic ester
3-Methylcrotonaldehyde	0.01	Aliphatic aldehyde
Ethyl 2-methylbutyrate	0.01	Aliphatic ester
(3Z)-Hexenol	0.01	Aliphatic alcohol
Hexanol	0.01	Aliphatic alcohol
Heptan-3-one	0.02	Aliphatic ketone
Hashishene	0.01	Monoterpene
Tricyclene	0.01	Monoterpene
$\alpha$ -Thujene	0.55	Monoterpene
$\alpha$ -Pinene	1.80	Monoterpene
Unknown	0.02	Monoterpene
Camphene	0.21	Monoterpene
Benzaldehyde	0.01	Simple phenolic
$\beta$ -Pinene	0.11	Monoterpene
Sabinene	0.01	Monoterpene
Octen-3-ol	0.30	Aliphatic alcohol
Octan-3-one	0.05	Aliphatic ketone
Myrcene	1.79	Monoterpene
Octan-3-ol	0.04	Aliphatic alcohol
$\alpha$ -Phellandrene	0.09	Monoterpene
Pseudolimonene	0.03	Monoterpene
$\Delta^3$ -Carene	0.09	Monoterpene
$\alpha$ -Terpinene	1.32	Monoterpene
<i>meta</i> -Cymene	0.04	Monoterpene
<i>para</i> -Cymene	21.91	Monoterpene
$\beta$ -Phellandrene	0.08	Monoterpene
Limonene	0.26	Monoterpene
1,8-Cineole	0.72	Monoterpenic ether
<i>ortho</i> -Cymene	0.01	Monoterpene
(Z)- $\beta$ -Ocimene	0.03	Monoterpene
(E)- $\beta$ -Ocimene	0.05	Monoterpene
$\gamma$ -Terpinene	7.61	Monoterpene

2-Methylbutyl butyrate	0.07	Aliphatic ester
<i>cis</i> -Sabinene hydrate	0.12	Monoterpenic alcohol
3-Methyl-3-butenyl butyrate?	0.02	Aliphatic ester
<i>cis</i> -Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Fenchone	0.02	Monoterpenic ketone
<i>meta</i> -Cymenene	0.01	Monoterpene
<i>para</i> -Cymenene	0.05	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	0.03	Monoterpenic alcohol
Terpinolene	0.07	Monoterpene
Methyl benzoate	0.01	Phenolic ester
<i>trans</i> -Sabinene hydrate	0.07	Monoterpenic alcohol
Linalool	2.62	Monoterpenic alcohol
Hotrienol	0.01	Monoterpenic alcohol
Nonanal	0.01	Aliphatic aldehyde
<i>cis-para</i> -Menth-2-en-1-ol	0.03	Monoterpenic alcohol
<i>trans</i> -Pinocarveol	0.01	Monoterpenic alcohol
Camphor	0.05	Monoterpenic ketone
<i>trans-para</i> -Menth-2-en-1-ol	0.04	Monoterpenic alcohol
<i>trans</i> -Chrysanthemal	0.01	Monoterpenic aldehyde
Unknown	0.02	Oxygenated monoterpene
Isoborneol	0.02	Monoterpenic alcohol
Borneol	0.30	Monoterpenic alcohol
Lavandulol	0.04	Monoterpenic alcohol
Terpinen-4-ol	1.55	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.06	Monoterpenic alcohol
$\alpha$ -Terpineol	0.18	Monoterpenic alcohol
Thymol methyl ether	0.41	Monoterpenic ether
Carvacrol methyl ether	0.16	Monoterpenic ether
Geraniol	0.01	Monoterpenic alcohol
Verbenone isomer?	0.04	Monoterpenic ketone
Geranial	0.01	Monoterpenic aldehyde
Decanol	0.01	Aliphatic alcohol
Bornyl acetate	0.04	Monoterpenic ester
Thymol analogue I (isothymol?)	0.13	Monoterpenic alcohol
Thymol analogue II	0.17	Monoterpenic alcohol
Thymol	44.58	Monoterpenic alcohol
Carvacrol	5.07	Monoterpenic alcohol
Thymyl acetate	0.09	Monoterpenic ester
Eugenol	0.03	Phenylpropanoid
$\alpha$ -Copaene	0.04	Sesquiterpene
$\beta$ -Bourbonene	0.02	Sesquiterpene
Unknown	0.01	Unknown
Isocaryophyllene	0.02	Sesquiterpene
$\alpha$ -Gurjunene	0.02	Sesquiterpene
$\beta$ -Caryophyllene	2.24	Sesquiterpene

Aromadendrene	0.16	Sesquiterpene
Unknown THVU XXIV [m/z 165, 180 (46), 150 (15), 105 (13)...]	0.15	Unknown
$\alpha$ -Humulene	0.61	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
$\gamma$ -Muurolene	0.06	Sesquiterpene
Germacrene D	0.04	Sesquiterpene
$\beta$ -Selinene	0.03	Sesquiterpene
Viridiflorene	0.13	Sesquiterpene
Bicyclogermacrene	0.13	Sesquiterpene
$\beta$ -Himachalene	0.01	Sesquiterpene
$\alpha$ -Muurolene	0.03	Sesquiterpene
$\gamma$ -Cadinene	0.08	Sesquiterpene
$\beta$ -Bisabolene	0.01	Sesquiterpene
<i>trans</i> -Calamenene	0.02	Sesquiterpene
$\delta$ -Cadinene	0.13	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.01	Sesquiterpene
$\alpha$ -Cadinene	0.02	Sesquiterpene
Geranyl butyrate	0.01	Monoterpenic ester
Spathulenol	0.04	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.04	Sesquiterpenic ether
Caryophyllene oxide	0.45	Sesquiterpenic ether
Humulene epoxide II	0.13	Sesquiterpenic ether
10-epi- $\gamma$ -Eudesmol	0.03	Sesquiterpenic alcohol
1-epi-Cubenol	0.01	Sesquiterpenic alcohol
Caryophylladienol II	0.01	Sesquiterpenic alcohol
Isospathulenol	0.01	Sesquiterpenic alcohol
$\tau$ -Cadinol	0.04	Sesquiterpenic alcohol
$\alpha$ -Cadinol	0.01	Sesquiterpenic alcohol
(3Z)-Caryophylla-3,8(13)-dien-5 $\beta$ -ol	0.05	Sesquiterpenic alcohol
Unknown	0.01	Unknown
Unknown	0.04	Unknown
Unknown	0.07	Unknown
Unknown	0.01	Unknown
<i>meta</i> -Camphorene	0.02	Diterpene
Unknown	0.01	Unknown
Unknown	0.02	Unknown
Unknown	0.01	Unknown
Unknown	0.04	Unknown
Unknown	0.02	Unknown
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Unknown	0.09	Unknown
Unknown	0.02	Unknown

<b>Consolidated total</b>	<b>98.73</b>
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tr: The compound has been detected below 0.005% of the 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.

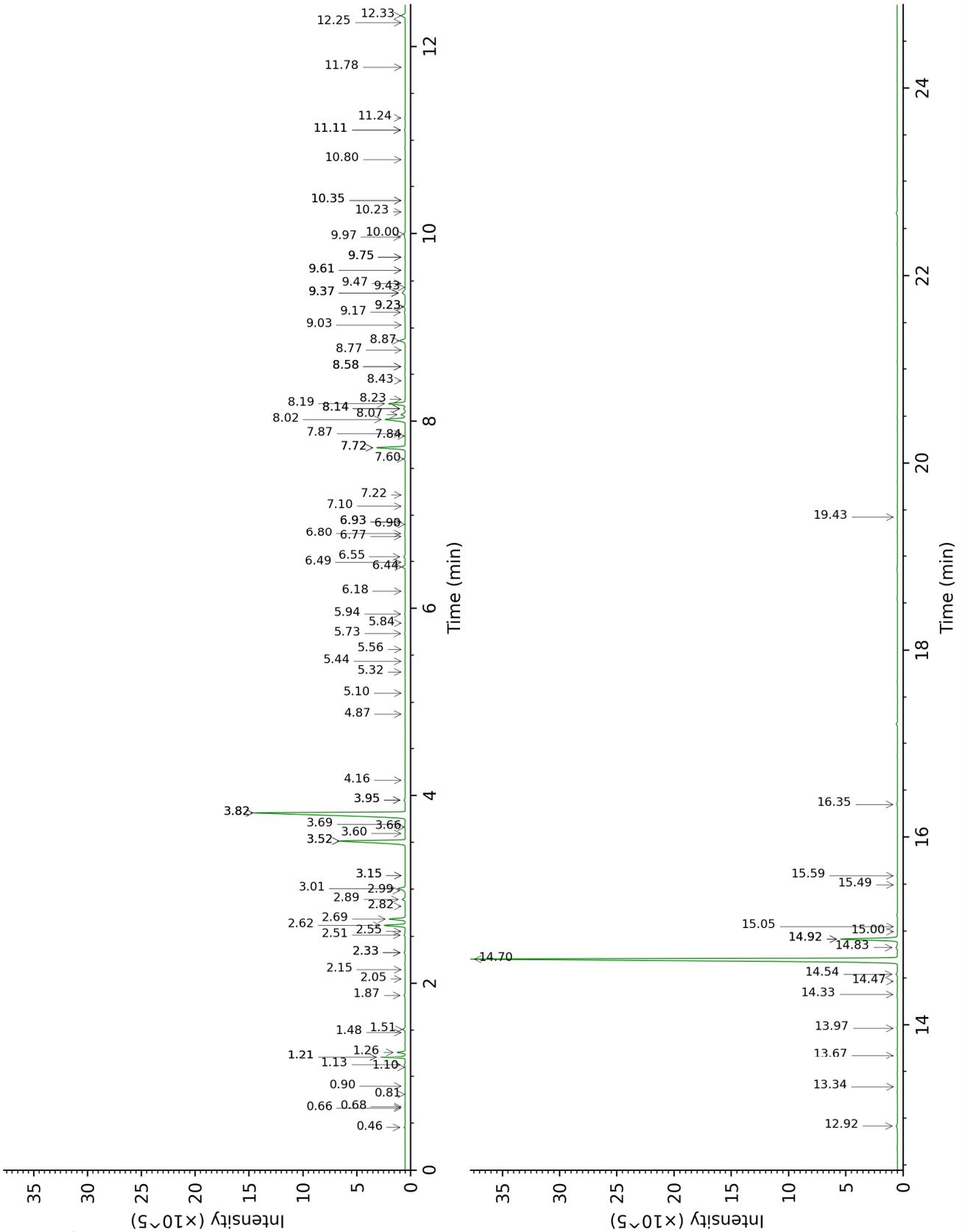
**Unknowns:** Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

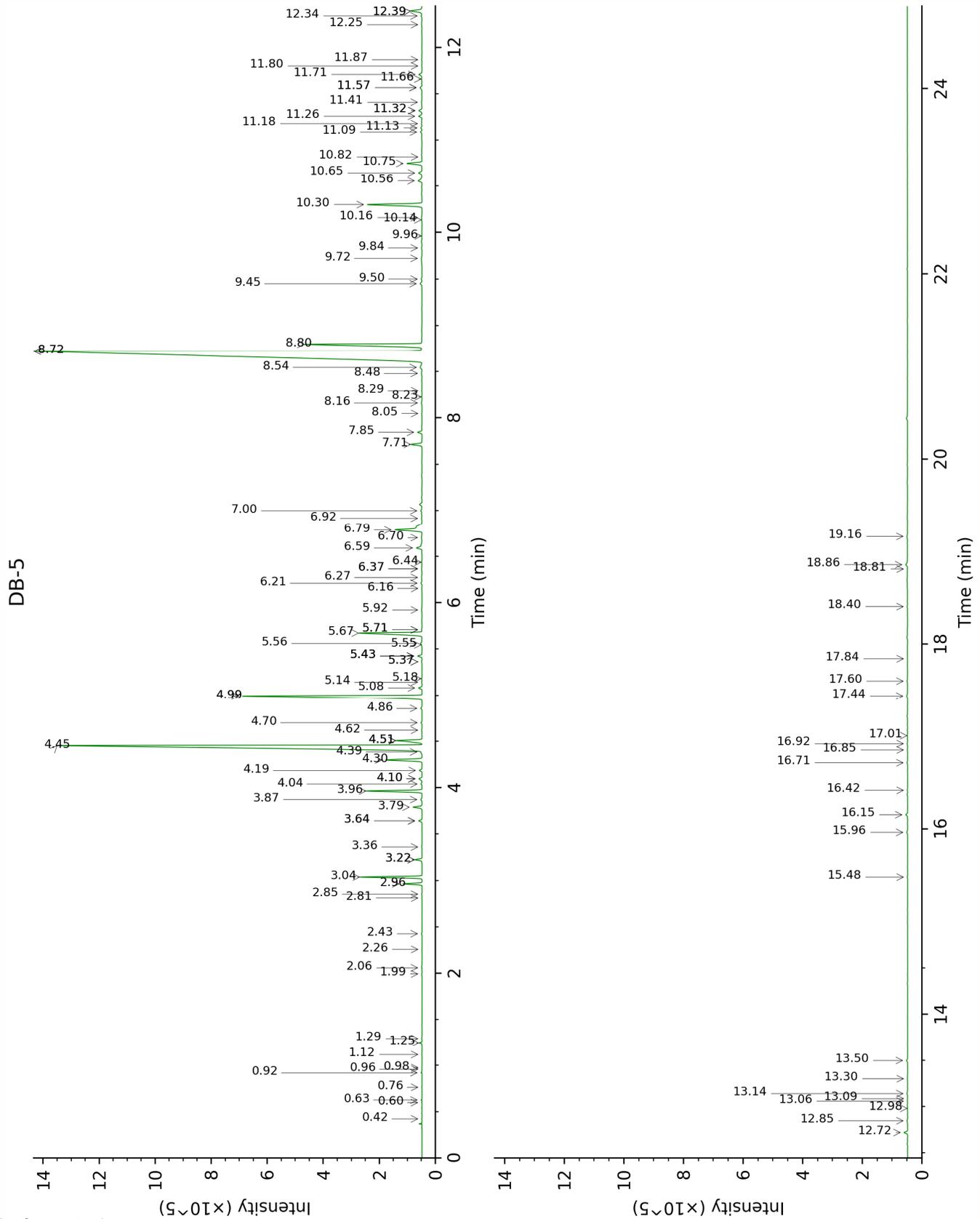
**Bracketed value ([xx]):** A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

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Thyme Thymol - Turkey - T40115R

DB-WAX





FULL ANALYSIS DATA

Isobutyral	Column DB-WAX			Column DB-5		
	0.46	781.6	0.04	0.42	539.3	tr
Isovaleral	0.68	886.2	0.01	0.60	642.3	0.01
2-Methylbutyral	0.66	880.2	0.01	0.63	652.6	0.01
2-Ethylfuran	0.81	921.5	tr	0.76	702.3	tr
3-Methyl-3-butenol	3.60	1212.3	0.02	0.92	727.3	0.02
Isoamyl alcohol	3.15*	1176.8	[0.01]	0.96	732.9	tr
2-Methylbutanol	3.15*	1176.8	[0.01]	0.98	735.3	tr
Ethyl isobutyrate	0.90	936.9	tr	1.12	755.7	0.01
Methyl 2-methylbutyrate	1.13	976.6	0.06	1.25	774.6	0.07
3-Methylcrotonaldehyde	2.82	1150.6	0.01	1.30	781.1	0.01
Ethyl 2-methylbutyrate	1.48	1025.0	0.01	1.99	849.9	0.01
(3Z)-Hexenol	5.44	1346.4	0.03	2.06	855.5	0.01
Hexanol	5.10	1321.4	0.01	2.26	872.3	0.01
Heptan-3-one	2.33*	1111.2	[0.09]	2.43	886.5	0.02
Hashishene	1.21*	991.3	[1.81]	2.81	916.0	0.01
Tricyclene	1.10	971.9	0.01	2.85	918.8	0.01
$\alpha$ -Thujene	1.26	1001.0	0.55	2.96	926.2	0.55
$\alpha$ -Pinene	1.21*	991.3	[1.81]	3.04	931.1	1.80
Unknown SAOF I [m/z 91, 92 (47), 65 (11)... 134 (1)]	2.15	1094.0	0.02	3.22*	943.6	[0.21]
Camphene	1.51	1028.4	0.21	3.22*	943.6	[0.21]
Benzaldehyde	6.93*	1457.7	[0.05]	3.36	952.8	0.01
$\beta$ -Pinene	1.87	1065.7	0.11	3.64*	971.7	[0.12]
Sabinene	2.05	1083.7	0.01	3.64*	971.7	[0.12]
Octen-3-ol	6.44	1420.8	0.29	3.79	981.6	0.30
Octan-3-one	3.69	1219.4	0.04	3.87	987.1	0.05
Myrcene	2.62	1134.4	1.77	3.96	993.3	1.79
Octan-3-ol	5.73	1368.2	0.06	4.04	998.3	0.04
$\alpha$ -Phellandrene	2.51	1126.0	0.09	4.10*	1002.1	[0.13]
Pseudolimonene	2.55	1129.3	0.03	4.10*	1002.1	[0.13]
$\Delta^3$ -Carene	2.33*	1111.2	[0.09]	4.19	1008.0	0.09
$\alpha$ -Terpinene	2.68	1139.7	1.31	4.30	1015.1	1.32
<i>meta</i> -Cymene	3.82*	1228.5	[21.94]	4.39	1020.6	0.04
<i>para</i> -Cymene	3.82*	1228.5	[21.94]	4.45	1024.9	21.91
$\beta$ -Phellandrene	2.99	1164.0	0.08	4.51*	1028.3	[1.07]
Limonene	2.89	1156.5	0.26	4.51*	1028.3	[1.07]
1,8-Cineole	3.01	1165.6	0.72	4.51*	1028.3	[1.07]
<i>ortho</i> -Cymene	4.16	1254.1	0.02	4.62	1035.5	0.01
(Z)- $\beta$ -Ocimene	3.52*	1206.3	[7.64]	4.70	1040.6	0.03

(E)- $\beta$ -Ocimene	3.66	1217.3	0.03	4.86	1050.5	0.05
$\gamma$ -Terpinene	3.52*	1206.3	[7.64]	4.99*	1059.2	[7.67]
2-Methylbutyl butyrate	3.95*	1238.5	[0.11]	4.99*	1059.2	[7.67]
cis-Sabinene hydrate	6.55	1429.0	0.13	5.08	1064.8	0.12
3-Methyl-3-butenyl butyrate?	4.87	1306.3	0.02	5.14	1068.8	0.02
cis-Linalool oxide (fur.)	6.18	1401.3	0.02	5.18	1071.2	0.01
Fenchone	5.32	1338.0	0.02	5.36*	1082.8	[0.02]
meta-Cymenene	5.84	1376.3	0.01	5.36*	1082.8	[0.02]
para-Cymenene	5.94	1383.4	0.05	5.43*	1086.7	[0.15]
trans-Linalool oxide (fur.)	6.49	1424.6	0.03	5.43*	1086.7	[0.15]
Terpinolene	3.95*	1238.5	[0.11]	5.43*	1086.7	[0.15]
Methyl benzoate	8.24	1558.9	0.02	5.55	1094.4	0.01
trans-Sabinene hydrate	7.60	1508.6	0.09	5.56	1095.3	0.07
Linalool	7.72*	1518.1	[2.65]	5.67	1102.5	2.62
Hotrienol	8.43	1574.5	0.01	5.71*	1104.7	[0.02]
Nonanal	5.56	1355.7	0.01	5.71*	1104.7	[0.02]
cis-para-Menth-2-en-1-ol	7.72*	1518.1	[2.65]	5.92	1118.5	0.03
trans-Pinocarveol	8.77	1600.9	0.01	6.16	1133.6	0.01
Camphor	6.80	1447.8	0.07	6.21	1137.3	0.05
trans-para-Menth-2-en-1-ol	8.58*	1586.4	[0.05]	6.27	1141.3	0.04
trans-Chrysanthemal	6.90	1455.8	0.01	6.37*	1147.4	[0.03]
Unknown DRMO V [m/z 123, 81 (60), 67 (49), 95 (36), 41 (29), 68 (25)...152 (2)]	6.93*	1457.7	[0.05]	6.37*	1147.4	[0.03]
Isoborneol	9.03	1622.6	0.02	6.44	1152.0	0.02
Borneol	9.37*	1650.7	[0.43]	6.59†	1162.0	0.24
Lavandulol	9.23*	1638.6	[0.13]	6.70	1169.3	0.04
Terpinen-4-ol	8.19	1555.2	1.63	6.79†	1174.7	1.22
para-Cymen-8-ol	11.11*	1797.9	[0.10]	6.92†	1183.1	0.03
$\alpha$ -Terpineol	9.37*	1650.7	[0.43]	7.00†	1188.5	0.05
Thymol methyl ether	8.07	1546.0	0.43	7.72	1236.4	0.41
Carvacrol methyl ether	8.14*	1551.1	[0.15]	7.85	1245.3	0.16
Geraniol	11.24	1809.1	0.04	8.05	1259.1	0.01
Verbenone isomer?				8.16	1266.9	0.04
Geranial	9.75*	1682.0	[0.02]	8.23	1271.4	0.01
Decanol	10.35*	1732.6	[0.03]	8.29	1275.9	0.01
Bornyl acetate	7.87	1529.9	0.02	8.48	1288.7	0.04
Thymol analogue I	14.54	2119.4	0.14	8.54	1293.1	0.13

(isothymol?)						
Thymol analogue II	14.83	2148.3	0.17	8.72*	1305.2	[44.67]
Thymol	14.70	2135.7	44.58	8.72*	1305.2	[44.67]
Carvacrol	14.92*	2157.4	[5.06]	8.80	1307.5	5.07
Thymyl acetate	11.11*	1797.9	[0.10]	9.45	1353.8	0.09
Eugenol	14.33	2098.0	0.06	9.50	1357.3	0.03
$\alpha$ -Copaene	6.77	1445.4	0.03	9.72	1373.2	0.04
$\beta$ -Bourbonene	7.10	1470.4	0.02	9.84	1381.1	0.02
Unknown MEPU VII [m/z 148, 133 (66), 105 (46), 43 (33), 77 (15)...]				9.96	1390.3	0.01
Isocaryophyllene	7.84	1528.0	0.02	10.14	1402.6	0.02
$\alpha$ -Gurjunene	7.22	1479.5	0.02	10.16	1404.2	0.02
$\beta$ -Caryophyllene	8.02	1541.9	2.26	10.30	1414.7	2.24
Aromadendrene	8.14*	1551.1	[0.15]	10.56	1433.9	0.16
Unknown THVU XXIV [m/z 165, 180 (46), 150 (15), 105 (13)...]				10.65	1440.6	0.15
$\alpha$ -Humulene	8.87	1608.7	0.60	10.75	1448.3	0.61
allo-Aromadendrene	8.58*	1586.4	[0.05]	10.82	1453.6	0.01
$\gamma$ -Muurolene	9.17	1633.7	0.11	11.09	1473.7	0.06
Germacrene D	9.37*	1650.7	[0.43]	11.13	1477.0	0.04
$\beta$ -Selinene	9.48	1659.1	0.04	11.18	1480.5	0.03
Viridiflorene	9.23*	1638.6	[0.13]	11.26	1486.4	0.13
Bicyclogermacrene	9.61*	1670.6	[0.03]	11.32*	1491.0	[0.14]
$\beta$ -Himachalene	9.43	1655.6	0.01	11.32*	1491.0	[0.14]
$\alpha$ -Muurolene	9.61*	1670.6	[0.03]	11.41	1497.8	0.03
$\gamma$ -Cadinene	9.97	1699.6	0.08	11.57*	1509.7	[0.09]
$\beta$ -Bisabolene	9.75*	1682.0	[0.02]	11.57*	1509.7	[0.09]
<i>trans</i> -Calamenene	10.80	1770.8	0.01	11.66	1517.0	0.02
$\delta$ -Cadinene	10.00	1702.2	0.14	11.71	1520.9	0.13
<i>trans</i> -Cadina-1,4-diene	10.23	1722.1	0.01	11.80	1528.2	0.01
$\alpha$ -Cadinene	10.35*	1732.6	[0.03]	11.87	1533.5	0.02
Geranyl butyrate	11.78	1857.7	0.01	12.25	1563.3	0.01
Spathulenol	13.97	2062.8	0.04	12.34	1570.7	0.04
Caryophyllene oxide isomer	12.25	1900.5	0.04	12.39*	1575.0	[0.50]
Caryophyllene oxide	12.33	1907.2	0.45	12.39*	1575.0	[0.50]
Humulene epoxide II	12.92	1962.2	0.13	12.72	1600.8	0.13
10-epi- $\gamma$ -Eudesmol	13.67	2034.4	0.03	12.85	1611.0	0.03
1-epi-Cubenol	13.34	2001.6	tr	12.98	1622.1	0.01
Caryophylladienol II	15.59	2226.4	0.04	13.06	1628.5	0.01
Isospathulenol	15.00	2165.5	0.01	13.09	1630.8	0.01
$\tau$ -Cadinol	14.47	2111.6	0.03	13.14	1635.3	0.04
$\alpha$ -Cadinol	15.05	2171.0	0.02	13.30	1648.7	0.01

(3Z)-Caryophylla-3,8(13)-dien-5β-ol	16.35	2306.1	0.08	13.50	1665.1	0.05
Unknown UNKN XX [m/z 81, 136 (68), 135 (58), 150 (44), 93 (34), 121 (30)...]				15.48	1837.0	0.01
Unknown THVU XVI [m/z 81, 136 (62), 135 (56), 150 (39), 93 (33), 121 (24)...]				15.96	1881.0	0.04
Unknown THVU III [m/z 136, 81 (96), 135 (76), 93 (48), 150 (47), 121 (43), 137 (28)...]				16.15	1898.3	0.07
Unknown ORVU X [m/z 136, 81 (81), 150 (74), 135 (52), 93 (46), 121 (42)...]	15.49	2216.2	0.01	16.42	1923.0	0.01
<i>meta</i> -Camphorene	14.92*	2157.4	[5.06]	16.71	1951.4	0.02
Unknown THVU IV [m/z 201, 159 (37), 148 (27), 173 (22), 41 (20)... 284 (16)]				16.85	1964.6	0.01
Unknown THVU V [m/z 135, 150 (90), 201 (83), 81 (52), 136 (35)... 286 (25)]				16.92	1971.0	0.02
Unknown THVU VI [m/z 135, 150 (61), 81 (45), 69 (37), 41 (24), 136 (21), 93 (19)...]				17.01	1979.3	0.01
Unknown THVU VII [m/z 135, 150 (67), 69 (57), 41 (24)...]				17.44	2021.1	0.04
Unknown UNKN XXIV [m/z 135, 43 (51), 150 (36), 109 (30), 93 (27), 95 (21)...]				17.60	2037.2	0.02
Unknown THVU VIII [m/z 173, 159 (29), 216 (27), 286 (15)]				17.84	2061.2	0.01
Unknown MOFI V [m/z 69, 41 (81), 91 (37), 166 (35), 105 (33), 43 (30)...]	19.42	2655.7	0.02	18.40	2117.4	0.01
Unknown THVU XI				18.81	2159.5	0.01

[m/z 163, 175 (91), 173 (83), 161 (82), 41 (66), 286 (66)]			
Unknown THVU XII [m/z 267, 282 (24), 268 (21), 117 (16), 126 (11)...]	18.86	2164.3	0.09
Unknown THVU XIII [m/z 175, 163 (78), 161 (33), 41 (32)... 286 (18)]	19.16	2196.0	0.02
Total reported	97.92%	98.14%	

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

[xx]: Duplicate percentage due to coelutions, only the first one is 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