

Date : 2024-08-29

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24H16-PTH10

Customer Identification : Thyme (Thymol / Red) - Spain - T40113R

Type : Essential Oil

Source : *Thymus zygis*

Customer : Plant Therapy

Checked and approved by:

Alexis St-Gelais, Ph. D., Chimiste 2013-174

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

Date : 2024-08-26

PHYSICOCHEMICAL DATA

Refractive index : 1.5027 ± 0.0003 (20 °C)

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

Analyst : Cassandra Baker

Date : 2024-08-19

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
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	0.01	Aliphatic alcohol
Methyl 2-methylbutyrate	0.01	Aliphatic ester
Unknown	tr	Unknown
(3Z)-Hexenol	0.01	Aliphatic alcohol
Hexanol	0.01	Aliphatic alcohol
Hashishene	0.01	Monoterpene
Tricyclene	0.05	Monoterpene
α -Thujene	1.14	Monoterpene
α -Pinene	0.84	Monoterpene
Unknown	0.03	Monoterpene
α -Fenchene	0.01	Monoterpene
Camphene	0.47	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
β -Pinene	0.18	Monoterpene
Sabinene	0.02	Monoterpene
Octen-3-ol	0.05	Aliphatic alcohol
Octan-3-one	0.08	Aliphatic ketone
Myrcene	1.97	Monoterpene
Octan-3-ol	0.04	Aliphatic alcohol
Pseudolimonene	0.02	Monoterpene
α -Phellandrene	0.17	Monoterpene
Δ^3 -Carene	0.08	Monoterpene
<i>cis</i> -Dehydroxylinalool oxide	tr	Monoterpenic ether
α -Terpinene	1.57	Monoterpene
<i>para</i> -Cymene	18.77	Monoterpene
1,8-Cineole	0.29	Monoterpenic ether
Limonene	0.38	Monoterpene
(Z)- β -Ocimene	0.01	Monoterpene
(E)- β -Ocimene	0.04	Monoterpene
γ -Terpinene	7.45	Monoterpene
2-Methylbutyl butyrate	0.01	Aliphatic ester
<i>cis</i> -Sabinene hydrate	0.26	Monoterpenic alcohol
3-Methyl-3-butenyl butyrate?	0.01	Aliphatic ester
<i>cis</i> -Linalool oxide (fur.)	0.03	Monoterpenic alcohol
<i>trans</i> -Linalool oxide (fur.)	0.12	Monoterpenic alcohol

<i>para</i> -Cymenene	0.05	Monoterpene
Terpinolene	0.11	Monoterpene
<i>trans</i> -Sabinene hydrate	0.11	Monoterpenic alcohol
Linalool	3.98	Monoterpenic alcohol
Nonanal	0.01	Aliphatic aldehyde
Hotrienol	0.01	Monoterpenic alcohol
Unknown	0.08	Unknown
<i>trans</i> -Pinocarveol	0.02	Monoterpenic alcohol
Unknown	0.15	Unknown
Camphor	0.05	Monoterpenic ketone
<i>trans-para</i> -Menth-2-en-1-ol	0.03	Monoterpenic alcohol
Camphene hydrate	0.01	Monoterpenic alcohol
<i>trans</i> -Chrysanthemal	0.07	Monoterpenic aldehyde
Borneol	0.91	Monoterpenic alcohol
Lavandulol	0.04	Monoterpenic alcohol
Terpinen-4-ol	0.90	Monoterpenic alcohol
Unknown	tr	Unknown
<i>para</i> -Cymen-8-ol	0.05	Monoterpenic alcohol
α -Terpineol	0.05	Monoterpenic alcohol
<i>cis</i> -Dihydrocarvone	0.08	Monoterpenic ketone
<i>trans</i> -Dihydrocarvone	0.01	Monoterpenic ketone
Bornyl formate	0.04	Monoterpenic ester
Nerol	0.05	Monoterpenic alcohol
Thymol methyl ether	0.02	Monoterpenic ether
Neral	0.01	Monoterpenic aldehyde
Carvacrol methyl ether	0.28	Monoterpenic ether
Geraniol	0.06	Monoterpenic alcohol
Geranial	0.13	Monoterpenic aldehyde
Unknown	0.14	Unknown
Bornyl acetate	0.03	Monoterpenic ester
Thymol analogue I (isothymol?)	0.08	Monoterpenic alcohol
Thymol	51.05	Monoterpenic alcohol
Carvacrol	3.70	Monoterpenic alcohol
Thymyl acetate	0.02	Monoterpenic ester
Eugenol	0.05	Phenylpropanoid
α -Copaene	0.03	Sesquiterpene
Isocaryophyllene	0.01	Sesquiterpene
α -Gurjunene	0.02	Sesquiterpene
β -Caryophyllene	1.42	Sesquiterpene
Aromadendrene	0.10	Sesquiterpene
α -Humulene	0.05	Sesquiterpene
Unknown	0.02	Oxygenated monoterpene
allo-Aromadendrene	0.04	Sesquiterpene
Unknown	0.12	Unknown
Thymohydroquinone isomer?	0.15	Simple phenolic

γ -Muurolene	0.04	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
β -Selinene	0.01	Sesquiterpene
allo-Aromadendr-9-ene	0.02	Sesquiterpene
Viridiflorene	0.08	Sesquiterpene
α -Muurolene	0.02	Sesquiterpene
γ -Cadinene	0.05	Sesquiterpene
<i>trans</i> -Calamenene	0.01	Sesquiterpene
δ -Cadinene	0.13	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.01	Sesquiterpene
α -Cadinene	0.01	Sesquiterpene
Geranyl butyrate	0.05	Monoterpenic ester
Spathulenol	0.07	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.17	Sesquiterpenic ether
Unknown	0.03	Oxygenated sesquiterpene
Humulene epoxide II	0.02	Sesquiterpenic ether
Caryophylladienol II	0.01	Sesquiterpenic alcohol
(3 <i>Z</i>)-Caryophylla-3,8(13)-dien-5 β -ol	0.02	Sesquiterpenic alcohol
Unknown	0.02	Unknown
Unknown	0.05	Unknown
Unknown	0.06	Unknown
Unknown	0.01	Unknown
Unknown	0.02	Unknown
Unknown	0.01	Unknown
Consolidated total	99.48	

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

Note: no correction factor was applied

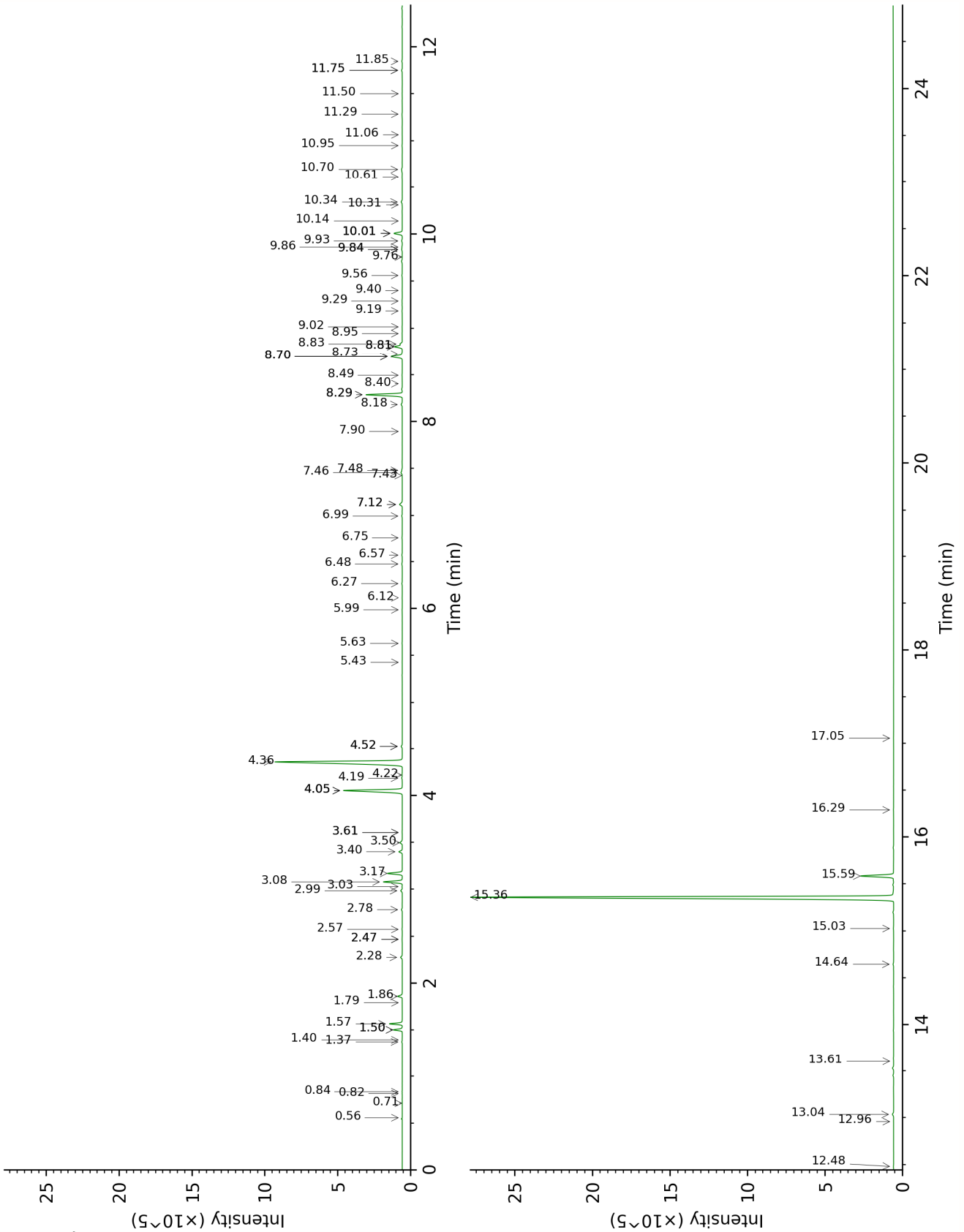
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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.

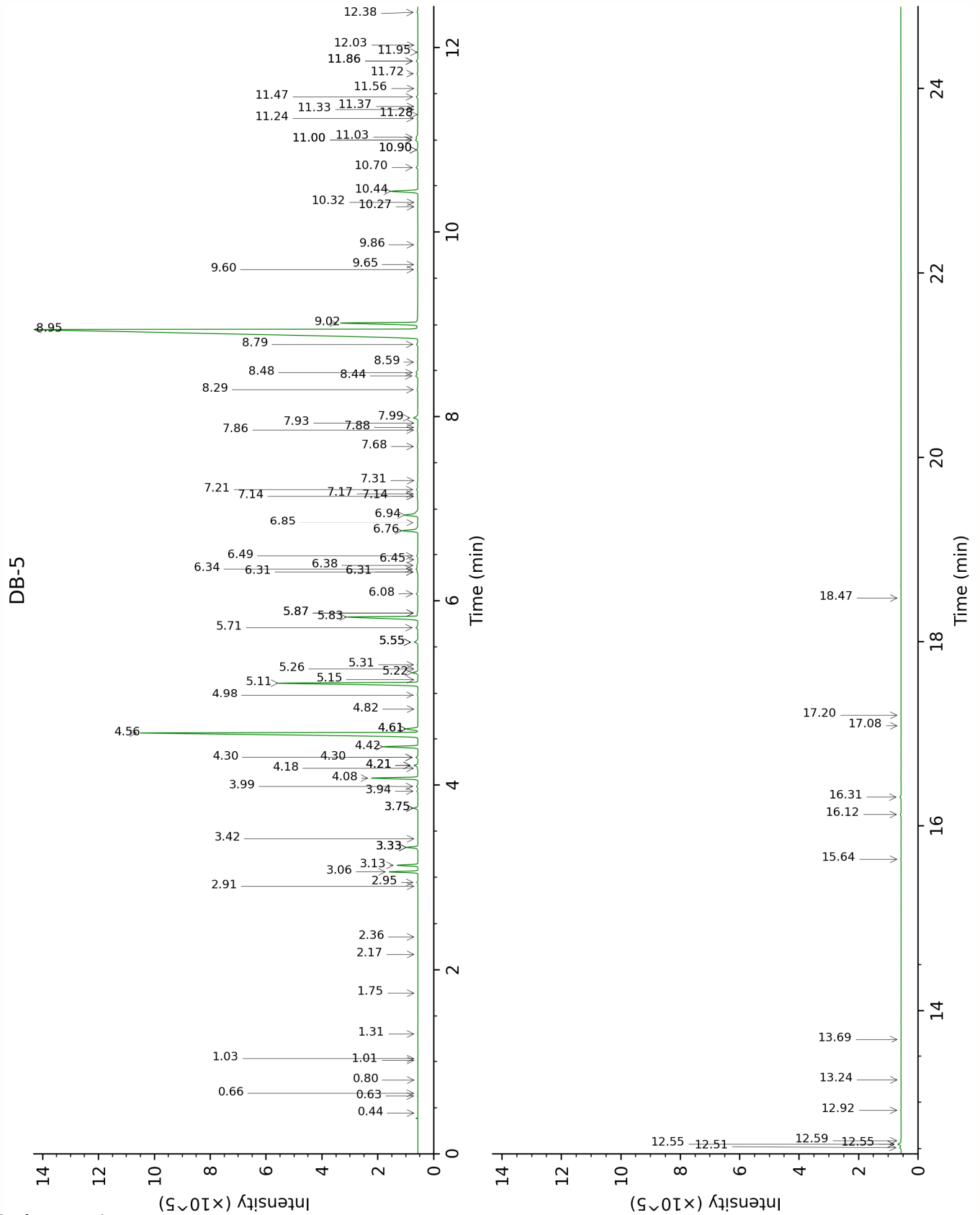
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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

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

DB-WAX





FULL ANALYSIS DATA

Isobutyral	Column DB-WAX			Column DB-5		
	0.56	784.2	tr	0.44	535.9	tr
Isovaleral	0.84	884.2	0.01	0.63	640.2	0.01
2-Methylbutyral	0.82	877.5	tr	0.66	650.6	0.01
2-Ethylfuran				0.80	700.1	tr
Isoamyl alcohol	3.61*	1173.9	[0.02]	1.01	732.3	tr
2-Methylbutanol	3.61*	1173.9	[0.02]	1.03	735.1	0.01
Methyl 2-methylbutyrate	1.40	975.9	0.01	1.31	773.4	0.01
Unknown PEGR III [m/z 81, 69 (80), 41 (65), 83 (52), 109 (48), 55 (47)...]	0.71	842.8	tr	1.75	822.4	tr
(3Z)-Hexenol	5.99	1345.3	0.02	2.17	857.1	0.01
Hexanol	5.63	1319.8	0.02	2.36	872.8	0.01
Hashishene	1.50*	992.2	[0.85]	2.91	915.2	0.01
Tricyclene	1.37	972.5	0.04	2.95	917.9	0.05
α -Thujene	1.57	999.3	1.15	3.06	925.5	1.14
α -Pinene	1.50*	992.2	[0.85]	3.13	930.1	0.84
Unknown SAOF I [m/z 91, 92 (47), 65 (11)... 134 (1)]	2.57	1095.1	0.03	3.33*	942.9	[0.51]
α -Fenchene	1.79	1020.7	0.01	3.33*	942.9	[0.51]
Camphene	1.86	1027.3	0.47	3.33*	942.9	[0.51]
Thuja-2,4(10)-diene	2.47*	1085.1	[0.02]	3.42	949.0	0.01
β -Pinene	2.28	1066.8	0.18	3.75*	970.9	[0.20]
Sabinene	2.47*	1085.1	[0.02]	3.75*	970.9	[0.20]
Octen-3-ol	6.99	1417.8	0.06	3.94	983.1	0.05
Octan-3-one	4.19	1216.7	0.06	3.99	986.4	0.08
Myrcene	3.08	1133.7	1.98	4.08	992.4	1.97
Octan-3-ol	6.27	1365.2	0.05	4.18	999.4	0.04
Pseudolimonene	3.03	1129.9	0.02	4.21*	1001.5	[0.20]
α -Phellandrene	2.99	1126.5	0.17	4.21*	1001.5	[0.20]
Δ 3-Carene	2.78	1111.1	0.08	4.30*	1007.0	[0.08]
<i>cis</i> -Dehydroxylinalool oxide	4.05*	1207.2	[7.52]	4.30*	1007.0	[0.08]
α -Terpinene	3.17	1140.7	1.58	4.42	1014.2	1.57
<i>para</i> -Cymene	4.36	1229.0	18.89	4.56	1023.4	18.77
1,8-Cineole	3.50	1165.7	0.29	4.61*	1026.2	[0.67]
Limonene	3.40	1158.3	0.38	4.61*	1026.2	[0.67]
(Z)- β -Ocimene	4.05*	1207.2	[7.52]	4.82	1039.6	0.01
(E)- β -Ocimene	4.22	1219.0	0.04	4.98	1049.4	0.04
γ -Terpinene	4.05*	1207.2	[7.52]	5.11	1057.7	7.45

2-Methylbutyl butyrate	4.52*	1240.8	[0.12]	5.15	1060.0	0.01
<i>cis</i> -Sabinene hydrate	7.12*	1426.9	[0.38]	5.22	1064.8	0.26
3-Methyl-3-butenyl butyrate?	5.43	1305.4	0.01	5.26	1067.3	0.01
<i>cis</i> -Linalool oxide (fur.)	6.75	1400.1	0.04	5.31	1070.1	0.03
<i>trans</i> -Linalool oxide (fur.)	7.12*	1426.9	[0.38]	5.55*	1085.4	[0.22]
<i>para</i> -Cymenene	6.57	1386.8	0.05	5.55*	1085.4	[0.22]
Terpinolene	4.52*	1240.8	[0.12]	5.55*	1085.4	[0.22]
<i>trans</i> -Sabinene hydrate	8.18	1505.9	0.14	5.71	1095.2	0.11
Linalool	8.29*	1514.0	[4.05]	5.83	1102.4	3.98
Nonanal	6.12	1354.4	0.01	5.87*	1105.2	[0.04]
Hotrienol	9.02	1570.0	0.01	5.87*	1105.2	[0.04]
Unknown CYFL II [m/z 81, 79 (19), 41 (12), 92 (8), 77 (8)...]	6.48	1380.1	0.05	6.08	1118.4	0.08
<i>trans</i> -Pinocarveol	9.40	1600.1	0.02	6.31*†	1133.5	[0.05]
Unknown MEOF V [m/z 70, 81 (94), 67 (52), 69 (45), 109 (44), 82 (35)...]				6.31*†	1133.5	[0.05]
Camphor	7.48	1453.7	0.05	6.34*†	1135.5	[0.11]
<i>trans-para</i> -Menth-2-en-1-ol	9.19	1583.0	0.03	6.38*†	1138.0	[0.09]
Camphene hydrate	8.73	1547.7	0.04	6.45	1142.0	0.01
<i>trans</i> -Chrysanthemal	7.46	1451.9	0.18	6.49	1144.6	0.07
Borneol	10.01*	1648.9	[1.01]	6.76	1161.9	0.91
Lavandulol	9.86	1637.1	0.04	6.85	1167.7	0.04
Terpinen-4-ol	8.81*†	1553.8	[0.94]	6.94†	1173.3	0.77
Unknown UNKN VI [m/z 43, 135 (73), 59 (46), 93 (39), 91 (35), 81 (32)...]				7.14*†	1186.2	[0.03]
<i>para</i> -Cymen-8-ol	11.75*	1793.8	[0.08]	7.14*†	1186.2	[0.03]
α -Terpineol	10.01*	1648.9	[1.01]	7.16	1187.8	0.05
<i>cis</i> -Dihydrocarvone	8.70*	1545.4	[1.43]	7.21	1190.8	0.08
<i>trans</i> -Dihydrocarvone	8.94	1564.5	0.02	7.31	1197.0	0.01
Bornyl formate	8.29*	1514.0	[4.05]	7.68	1221.4	0.04
Nerol	11.28	1754.3	0.04	7.86	1233.2	0.05
Thymol methyl ether	8.70*	1545.4	[1.43]	7.88	1235.1	0.02
Neral	9.76	1628.7	0.02	7.93	1238.3	0.01

Carvacrol methyl ether	8.83*†	1555.9	[0.23]	7.99	1242.1	0.28
Geraniol	11.85	1802.2	0.05	8.29	1262.4	0.06
Geranial	10.34	1675.7	0.14	8.44	1272.4	0.13
Unknown THVU XXIII [m/z 119, 91 (21), 150 (15), 117 (14), 41 (13)...]				8.48	1274.8	0.14
Bornyl acetate	8.50	1529.9	0.03	8.59	1282.3	0.03
Thymol analogue I (isothymol?)				8.79	1295.6	0.08
Thymol	15.36	2128.1	50.93	8.95	1306.5	51.05
Carvacrol	15.59	2150.6	3.60	9.02	1311.5	3.70
Thymyl acetate	11.75*	1793.8	[0.08]	9.60	1352.0	0.02
Eugenol	15.03	2095.0	0.05	9.65	1355.8	0.05
α-Copaene	7.43	1449.6	0.01	9.86	1370.8	0.03
Isocaryophyllene	8.40	1523.0	tr	10.27	1399.7	0.01
α-Gurjunene	7.90	1484.2	0.01	10.32	1403.0	0.02
β-Caryophyllene	8.70*	1545.4	[1.43]	10.44	1412.0	1.42
Aromadendrene	8.81*†	1553.8	[0.94]	10.70	1431.5	0.10
α-Humulene	9.56	1613.0	0.05	10.90*	1445.8	[0.07]
Unknown THVU I [m/z 151, 166 (40), 105 (26)...]				10.90*	1445.8	[0.07]
allo-Aromadendrene	9.29	1591.1	0.04	11.00*	1453.6	[0.16]
Unknown UNKN XXIX [m/z 151, 68 (64), 55 (58), 67 (56), 81 (45), 41 (44)...]				11.00*	1453.6	[0.16]
Thymohydroquinone isomer?				11.03	1456.0	0.15
γ-Muurolene	9.84*	1635.1	[0.08]	11.24	1471.0	0.04
Germacrene D	10.01*	1648.9	[1.01]	11.28	1474.1	0.01
β-Selinene	10.14	1659.5	0.02	11.33	1478.1	0.01
allo-Aromadendr-9-ene	9.84*	1635.1	[0.08]	11.37	1480.7	0.02
Viridiflorene	9.93	1642.4	0.07	11.47	1488.3	0.08
α-Muurolene	10.31	1673.3	0.01	11.56	1495.0	0.02
γ-Cadinene	10.61	1697.9	0.03	11.72	1507.3	0.05
trans-Calamenene	11.50	1772.7	0.01	11.86*	1517.9	[0.09]
δ-Cadinene	10.70	1704.7	0.13	11.86*	1517.9	[0.09]
trans-Cadina-1,4-diene	10.95	1726.1	0.03	11.95	1525.4	0.01
α-Cadinene	11.06	1735.8	0.02	12.03	1531.5	0.01
Geranyl butyrate	12.48	1857.8	0.04	12.38	1559.4	0.05

Spathulenol	14.64	2058.2	0.08	12.51	1569.3	0.07
Caryophyllene oxide isomer	12.96	1900.6	0.01	12.55*	1572.2	[0.16]
Caryophyllene oxide	13.04	1907.6	0.17	12.55*	1572.2	[0.16]
Unknown THVU II [m/z 161, 187 (29), 105 (24), 91 (23), 93 (23)... 205 (19), 220? (2)]				12.59	1575.1	0.03
Humulene epoxide II	13.60	1959.8	0.01	12.92	1600.9	0.02
Caryophylladienol II	16.29	2222.1	0.03	13.24	1628.1	0.01
(3Z)-Caryophylla- 3,8(13)-dien-5β-ol	17.05	2301.8	0.02	13.69	1664.7	0.02
Unknown UNKN XX [m/z 81, 136 (68), 135 (58), 150 (44), 93 (34), 121 (30)...]				15.64	1833.2	0.02
Unknown THVU XVI [m/z 81, 136 (62), 135 (56), 150 (39), 93 (33), 121 (24)...]				16.12	1877.2	0.05
Unknown THVU III [m/z 136, 81 (96), 135 (76), 93 (48), 150 (47), 121 (43), 137 (28)...]				16.31	1894.2	0.06
Unknown THVU IV [m/z 201, 159 (37), 148 (27), 173 (22), 41 (20)... 284 (16)]				17.08	1967.0	0.01
Unknown THVU VI [m/z 135, 150 (61), 81 (45), 69 (37), 41 (24), 136 (21), 93 (19)...]				17.20	1977.8	0.02
Unknown THVU X [m/z 163, 175 (51), 201 (40), 147 (33), 41 (31), 123 (29)... 286 (23)]				18.47	2103.4	0.01
Total reported		98.61%			99.38%	

*: 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.

Essential Oil, *Thymus zygis*
Internal code: 24H16-PTH10

Thyme (Thymol / Red) - Spain - T40113R

Report prepared for:
Plant Therapy

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