

GC/MS BATCH NUMBER: CD0103

ESSENTIAL OIL: CITRONELLA ORGANIC
BOTANICAL NAME: CYMBOPOGON WINTERIANUS
ORIGIN: PARAGUAY

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CITRONELLA ORGANIC OIL	%
CITRONELLAL	34.2
GERANIOL	19.7
CITRONELLOL	8.2
GERANYL ACETATE	6.8
CITRONELLYL ACETATE	3.9
α -ELEMOL	3.7
LIMONENE	3.2
INTERMEDEOL	2.2
GERMACRENE D	2.1
β -ELEMENE	1.8
δ -CADINENE	1.8
(Z,E)- α -FARNESENE	1.6

Comments from Robert Tisserand: Beautiful fresh, grassy-minty odor quality. Meets 12 of 14 ISO standards, with isopulegol slightly low, and geranyl acetate slightly high - not a concern here.

Date : December 12, 2017

SAMPLE IDENTIFICATION

Internal code : 17L11-PTH2-1-CC

Customer identification : Citronella Organic - Paraguay - CD010317R

Type : Essential oil

Source : *Cymbopogon winterianus*

Customer : Plant Therapy

ANALYSIS

Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

Analyst : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2017-12-12

Checked and approved by :

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

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
<i>trans</i> -2-Hexenal	2.39	857	0.01	0.03	943	1.11*	Aliphatic aldehyde
α -Thujene	3.31	920	0.01	[0.03]	943	1.11*	Monoterpene
α -Pinene	3.42	927	0.05	[0.03]	943	1.11*	Monoterpene
Sabinene	4.14	969	0.02	0.01	1053	1.90	Monoterpene
β -Pinene	4.20	973	0.03	0.02	1037	1.73	Monoterpene
Myrcene	4.48	989	0.07	0.06	1114	2.47*	Monoterpene
6-Methyl-5-hepten-2-one	4.55	993	0.09	0.08	1270	4.62	Aliphatic ketone
α -Phellandrene	4.76	1005	0.02	[0.06]	1114	2.47*	Monoterpene
Limonene	5.19	1028	3.18	3.09	1138	2.79*	Monoterpene
β -Phellandrene	5.21	1030	0.04	[3.09]	1138	2.79*	Monoterpene
1,8-Cineole	5.23	1031	0.01	[3.09]	1138	2.79*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.35	1037	0.01	0.01	1186	3.40*	Monoterpene
<i>trans</i> - β -Ocimene	5.54	1047	0.01	0.02	1205	3.65	Monoterpene
γ -Terpinene	5.74*	1058	0.08	[0.01]	1186	3.40*	Monoterpene
Bergamal	5.74*	1058	[0.08]	0.06	1288	4.89*	Aliphatic aldehyde
Terpinolene	6.20	1083	0.07	0.06	1222	3.90	Monoterpene
Linalool	6.72	1107	0.74	1.79	1486	8.62*	Monoterp. alcohol
<i>cis</i> -Rose oxide	6.80	1110	0.02	[0.06]	1288	4.89*	Monoterp. ether
Isopulegol	7.87	1149	0.80	[1.79]	1486	8.62*	Monoterp. alcohol
Citronellal	8.14	1159	34.21	33.51	1419	7.02	Monoterp. aldehyde
iso-Isopulegol	8.17	1160	0.23	0.36	1476	8.37*	Monoterp. alcohol
(<i>Z</i>)-Isocitral	8.31	1165	0.02	[0.36]	1476	8.37*	Monoterp. aldehyde
Rosefuran epoxide	8.46	1170	0.05	2.05	1523	9.69*	Monoterp. ether
Borneol	8.70	1179	0.02	2.00	1621	13.45*	Monoterp. alcohol
Terpinen-4-ol	8.85	1184	0.02	[2.05]	1523	9.69*	Monoterp. alcohol
(<i>E</i>)-Isocitral	8.90	1186	0.02	0.07	1514	9.36	Monoterp. aldehyde
α -Terpineol	9.52	1204	0.05	[2.00]	1621	13.45*	Monoterp. alcohol
Decanal	9.82	1211	0.10	0.27	1434	7.39*	Aliphatic aldehyde
Nerol	10.63	1229	0.16	0.15	1721	18.79	Monoterp. alcohol
Citronellol	11.03	1238	8.21	8.58	1702	17.65*	Monoterp. alcohol
Neral	11.20	1241	0.42	0.42	1590	12.13	Monoterp. aldehyde
Geraniol	12.24	1264	19.68	19.93	1775	22.37	Monoterp. alcohol
Geranial	12.77	1276	0.55	0.88	1641	14.46*	Monoterp. aldehyde
Geranyl formate	14.10	1303	0.02	[0.88]	1641	14.46*	Monoterp. ester
Citronellyl acetate	17.37	1352	3.91	4.19	1602	12.57	Monoterp. ester
α -Copaene	17.66	1357	0.13	[0.27]	1434	7.39*	Sesquiterpene
Neryl acetate	17.85	1359	0.63	1.64	1662	15.60*	Monoterp. ester
β -Bourbonene	18.18	1364	0.09	0.18	1453	7.82	Sesquiterpene
β -Elemene	19.03	1377	1.82	[2.05]	1523	9.69*	Sesquiterpene
Geranyl acetate	19.56	1385	6.81	6.83	1688	16.94	Monoterp. ester
β -Caryophyllene	20.67	1401	0.13	[2.05]	1523	9.69*	Sesquiterpene

Methyleugenol	21.58	1412	0.02	1.08	1947	33.85*	Phenylpropanoid
<i>cis</i> -Muurolo-3,5-diene	23.04	1429	0.05	0.03	1553	10.76	Sesquiterpene
α -Humulene	23.48	1435	0.11	0.10	1582	11.86	Sesquiterpene
Germacrene D	25.74	1462	2.05	[2.00]	1621	13.45*	Sesquiterpene
β -Selinene	26.32	1468	0.04	[2.00]	1621	13.45*	Sesquiterpene
α -Selinene	26.95	1476	0.05	[0.88]	1641	14.46*	Sesquiterpene
4- <i>epi</i> -Cubebol	27.67	1485	0.07	0.07	1796	23.73	Sesquiterp. alcohol
α -Muurolole	27.81	1486	0.37	[0.88]	1641	14.46*	Sesquiterpene
(<i>Z,E</i>)- α -Farnesene	27.92	1488	1.56	[1.64]	1662	15.60*	Sesquiterpene
γ -Cadinene	28.81	1498	0.43	[1.64]	1662	15.60*	Sesquiterpene
δ -Cadinene	29.49	1508	1.80	1.83	1674	16.24	Sesquiterpene
α -Cadinene	30.95	1528	0.12	[8.58]	1702	17.65*	Sesquiterpene
α -Elemol	32.89	1555	3.73	3.89	1988	35.74	Sesquiterp. alcohol
Germacrene D-4-ol	34.08*	1572	0.96	[1.08]	1947	33.85*	Sesquiterp. alcohol
Caryophyllene oxide	34.08*	1572	[0.96]	0.06	1845	27.16	Sesquiterp. ether
1,10- <i>diepi</i> -Cubenol	36.61	1615	0.19	[1.08]	1947	33.85*	Sesquiterp. alcohol
γ -Eudesmol	37.04	1626	0.39	0.75	2058	38.38*	Sesquiterp. alcohol
τ -Cadinol	37.62	1640	0.27	[0.75]	2058	38.38*	Sesquiterp. alcohol
τ -Muurolol	37.73	1643	0.32	0.41	2078	38.99	Sesquiterp. alcohol
α -Muurolol	37.86	1646	0.09	0.96	2100	39.71*	Sesquiterp. alcohol
β -Eudesmol	37.99	1649	0.69	[0.96]	2100	39.71*	Sesquiterp. alcohol
α -Cadinol	38.19	1654	0.73	0.98	2115	40.15	Sesquiterp. alcohol
Intermedeol	38.72	1667	2.24	2.01	2144	40.96	Sesquiterp. alcohol
(<i>2E,6E</i>)-Farnesol	40.73	1722	0.19	0.11	2290	44.56	Sesquiterp. alcohol
Total identified			99.01%	98.57%			

*: Two or more compounds are coeluting on this column

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

Note: no correction factor was applied

OTHER DATA

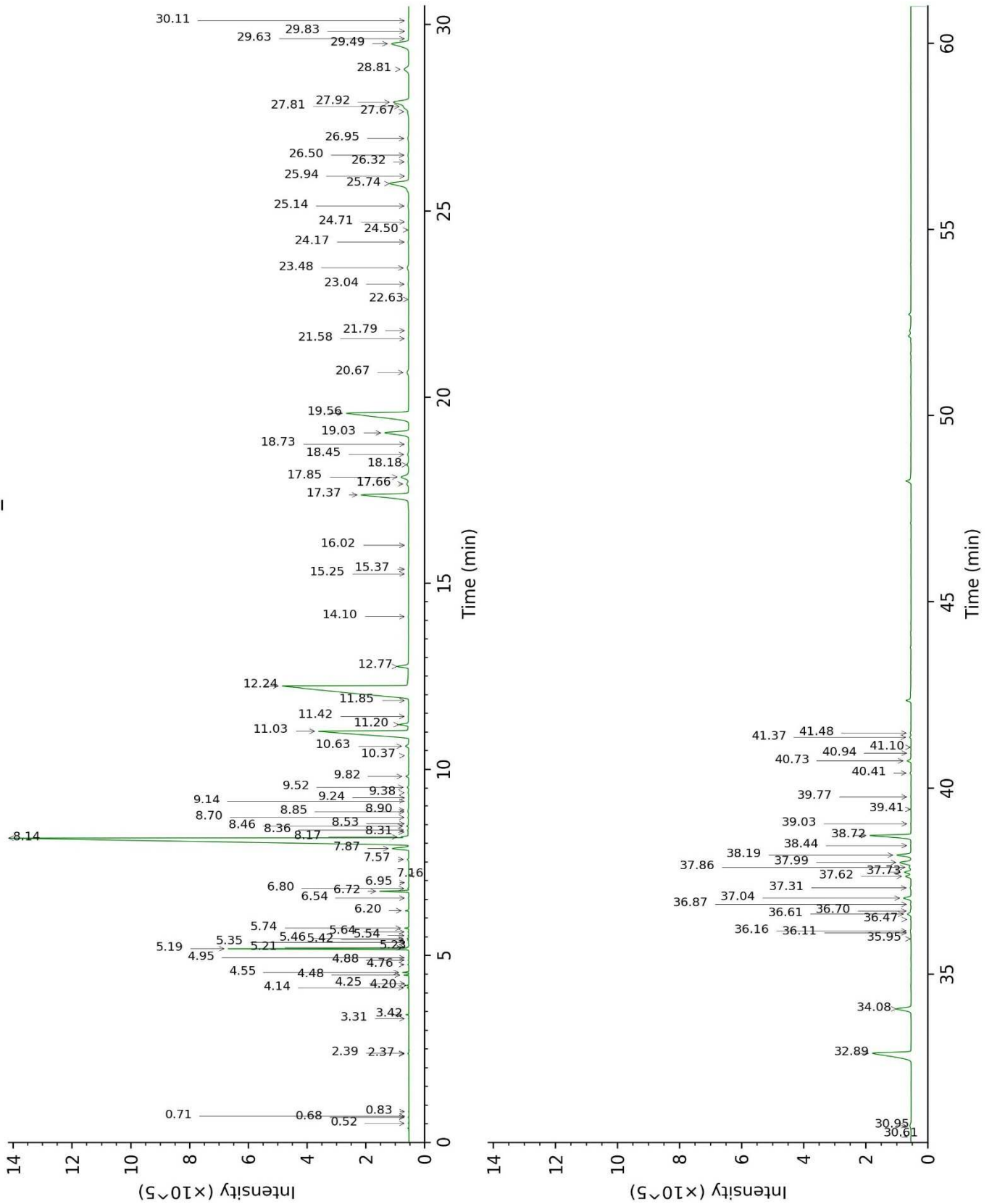
Physical aspect : Faintly yellow liquid

Refractive index : 1.4720 \pm 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent were detected using this method.

17L11-PTH2-1-CC_BP5



17L11-PTH2-1-CC_WAX

