

GC/MS BATCH NUMBER: BS0101

ESSENTIAL OIL: BLACK PEPPER ORGANIC

BOTANICAL NAME: PIPER NIGRUM

ORIGIN: SRI LANKA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BLACK PEPPER ORGANIC OIL	%
LIMONENE	18.4
β -CARYOPHYLLENE	17.9
SABINENE	12.6
β -PINENE	12.1
α -PINENE	10.4
α -COPAENE	3.8
Δ 3-CARENE	3.8
γ -CADINENE	3.4
MYRCENE	2.0
δ -CADINENE	1.8
α -THUJENE	1.6
δ -ELEMENE	1.2

Comments from Robert Tisserand: Radiant, spicy-woody odor quality. Nine of eleven key ISO constituents are within range for Sri Lankan Black Pepper oil, with α -selinene and d-3-carene marginally low - not a concern.

Date : December 13, 2017

SAMPLE IDENTIFICATION

Internal code : 17L11-PTH8-1-CC

Customer identification : Black Pepper Organic - Sri Lanka - BS010162R

Type : Essential oil

Source : *Piper nigrum*

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 : 2017-12-13

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.	
α -Thujene	3.32	921	1.62	3.86	954	1.16	Monoterpene
α -Pinene	3.45	928	10.37	7.95	947	1.13	Monoterpene
Camphene	3.71	944	0.26	0.42	1000	1.39	Monoterpene
Sabinene	4.18	971	12.62	13.35	1055	1.93	Monoterpene
β -Pinene	4.25	975	12.06	10.93	1040	1.76	Monoterpene
Myrcene	4.49	990	1.96	2.52	1115	2.47*	Monoterpene
α -Phellandrene	4.78*	1006	4.74	0.82	1109	2.40	Monoterpene
Δ^3 -Carene	4.78*	1006	[4.74]	3.75	1079	2.22	Monoterpene
α -Terpinene	4.95	1015	0.16	[2.52]	1115	2.47*	Monoterpene
Limonene	5.23*	1031	17.04	18.37	1142	2.84	Monoterpene
para-Cymene	5.23*	1031	[17.04]	0.28	1205	3.66	Monoterpene
cis- β -Ocimene	5.36	1038	0.02	0.26	1186	3.41*	Monoterpene
trans- β -Ocimene	5.54	1047	0.20	0.10	1201	3.60	Monoterpene
γ -Terpinene	5.73	1058	0.28	[0.26]	1186	3.41*	Monoterpene
cis-Sabinene hydrate	6.07	1076	0.09	0.08	1400	6.62	Monoterp. alcohol
Isoterpinolene	6.12	1079	0.05	0.33	1222	3.90*	Monoterpene
Terpinolene	6.21	1084	0.30	[0.33]	1222	3.90*	Monoterpene
Linalool	6.72	1107	0.27	0.27	1485	8.61	Monoterp. alcohol
Terpinen-4-ol	8.83	1184	0.23	19.24	1525	9.77*	Monoterp. alcohol
α -Terpineol	9.52	1204	0.05	0.63	1625	13.64*	Monoterp. alcohol
Bicycloelemene	15.10	1318	0.04	1.34	1418	7.01*	Sesquiterpene
δ -Elemene	15.36	1322	1.15	[1.34]	1418	7.01*	Sesquiterpene
α -Cubebene	16.01	1332	0.24	0.21	1410	6.82	Sesquiterpene
Cycloisositivene	17.06	1347	0.09	[1.34]	1418	7.01*	Sesquiterpene
α -Copaene	17.82	1359	3.78	3.93	1434	7.39	Sesquiterpene
β -Cubebene	18.72	1372	0.36	0.43	1475	8.36	Sesquiterpene
β -Elemene	19.00	1377	0.28	[19.24]	1525	9.77*	Sesquiterpene
α -Gurjunene	19.71	1387	0.12	0.09	1464	8.08	Sesquiterpene
β -Caryophyllene	20.92	1404	17.85	[19.24]	1525	9.77*	Sesquiterpene
β -Copaene	21.60	1412	0.13	[19.24]	1525	9.77*	Sesquiterpene
trans- α -Bergamotene	22.15	1419	0.07	[19.24]	1525	9.77*	Sesquiterpene
cis- β -Farnesene	23.06	1430	0.08	0.98	1581	11.81*	Sesquiterpene
α -Humulene	23.50	1435	0.93	[0.98]	1581	11.81*	Sesquiterpene
trans- β -Farnesene	24.57	1448	0.22	0.56	1620	13.37*	Sesquiterpene
γ -Muurolene	25.55	1459	0.06	0.08	1613	13.04	Sesquiterpene
Germacrene D	25.70	1461	0.38	[0.56]	1620	13.37*	Sesquiterpene
β -Selinene	26.33	1469	0.38	[0.63]	1625	13.64*	Sesquiterpene
ar-Curcumene	26.50	1471	0.14	0.17	1692	17.12*	Sesquiterpene
Bicyclgermacrene	26.96*	1476	0.49	0.15	1640	14.39	Sesquiterpene
α -Selinene	26.96*	1476	[0.49]	0.31	1630	13.91	Sesquiterpene
Valencene	27.63	1484	0.35	3.62	1659	15.43*	Sesquiterpene

4-epi-Cubebol	27.74	1485	0.26	0.21	1796	23.69	Sesquiterp. alcohol
α-Muurolene	27.90	1487	0.22	0.32	1644	14.62	Sesquiterpene
γ-Cadinene	29.05	1501	3.36	[3.62]	1659	15.43*	Sesquiterpene
δ-Cadinene	29.52*	1508	2.05	1.78	1673	16.16	Sesquiterpene
Cubebol	29.52*	1508	[2.05]	0.84	1843	27.00*	Sesquiterp. alcohol
<i>trans</i> -Calamenene	29.85	1513	0.08	0.07	1732	19.44	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	30.61	1523	0.08	[0.17]	1692	17.12*	Sesquiterpene
<i>trans</i> -α-Bisabolene	31.92	1542	0.09	0.06	1706	17.89	Sesquiterpene
Caryophyllene oxide	33.90*	1570	0.65	[0.84]	1843	27.00*	Sesquiterp. ether
(<i>E</i>)-Nerolidol	33.90*	1570	[0.65]	0.09	1981	35.41	Sesquiterp. alcohol
Spathulenol	34.08	1572	0.05	0.04	2020	37.16	Sesquiterp. alcohol
Isospathulenol	37.12	1627	0.13	0.12	2142	40.89	Sesquiterp. alcohol
τ-Muurolol	37.73	1642	0.13	0.15	2077	38.98	Sesquiterp. alcohol
α-Muurolol	37.86*	1646	0.64	0.69	2091	39.42	Sesquiterp. alcohol
β-Eudesmol	37.86*	1646	[0.64]	0.02	2114	40.12	Sesquiterp. alcohol
α-Cadinol	38.15	1653	0.03	0.03	2123	40.41	Sesquiterp. alcohol
Total identified			97.23%	99.45%			

*: 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

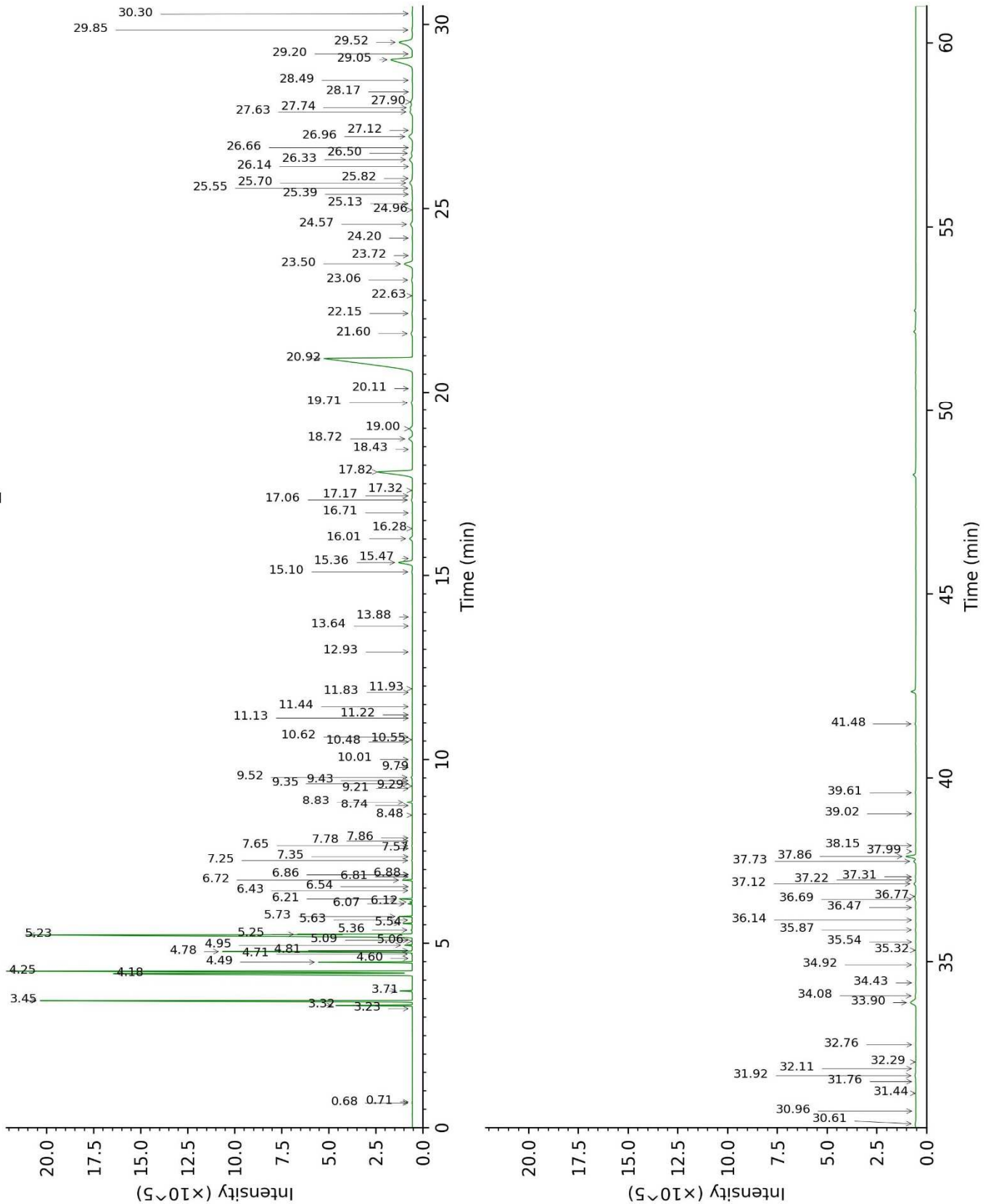
Physical aspect : Faintly yellow liquid

Refractive index : 1.4808 ± 0.0003 (20 °C)

CONCLUSION

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

17L11-PTH8-1-CC_BP5



17L11-PTH8-1-CC_WAX

