



PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: BSO100

ESSENTIAL OIL: BLACK PEPPER ORGANIC

BOTANICAL NAME: POPER NIGRUM

ORIGIN: SRI LANKA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BLACK PEPPER ORGANIC OIL	%
β -CARYOPHYLLENE	22.8
LIMONENE	13.8
SABINENE	10.3
β -PINENE	10.3
α -PINENE	10.0
α -COPAENE	4.3
Δ 3-CARENE	3.9
δ -CADINENE	2.2
MYRCENE	1.7
δ -ELEMENE	1.6
α -THUJENE	1.5
1,8-CINEOLE	1.4
α -HUMULENE	1.2

Comments from Robert Tisserand: Excellent odor quality. Eight of 12 constituents are within the ISO standard, though the other four are all borderline, and not a major concern.

Date : February 10, 2017

SAMPLE IDENTIFICATION

Internal code : 17A30-PTH1-1-DM

Customer identification : Black Pepper Organic - Sri Lanka - BSO10061R

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).

Analyst : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2017-02-08

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.	
Tricyclene	3.14	913	tr	tr	931	1.13	Monoterpene
α -Thujene	3.23	918	1.45	1.60	968	1.30	Monoterpene
α -Pinene	3.36	925	10.02	9.92	961	1.26	Monoterpene
Camphene	3.62*	941	0.26	0.25	1001	1.55	Monoterpene
α -Fenchene	3.62*	941	[0.26]	0.01	994	1.49	Monoterpene
Sabinene	4.08	968	10.31	10.41	1067	2.14	Monoterpene
β -Pinene	4.15	972	10.29	10.19	1049	1.96	Monoterpene
Myrcene	4.40	987	1.69	1.64	1120	2.70	Monoterpene
Δ 3-Carene	4.68*	1004	4.72	3.86	1100	2.44	Monoterpene
α -Phellandrene	4.68*	1004	[4.72]	0.86	1113	2.61	Monoterpene
α -Terpinene	4.85	1013	0.24	0.23	1126	2.79	Monoterpene
Limonene	5.13*	1028	14.44	13.78	1148	3.09	Monoterpene
para-Cymene	5.13*	1028	[14.44]	0.28	1212	3.96	Monoterpene
1,8-Cineole	5.14	1029	1.39	1.84	1153	3.14	Monoterp. ether
<i>cis</i> - β -Ocimene	5.27	1036	0.01	0.02	1190	3.64	Monoterpene
<i>trans</i> - β -Ocimene	5.45	1046	0.16	0.16	1205	3.85	Monoterpene
γ -Terpinene	5.63	1056	0.43	0.42	1193	3.67	Monoterpene
<i>cis</i> -Sabinene hydrate	5.99	1075	0.14	0.16	1407	7.12	Monoterp. alcohol
Isoterpinolene	6.02	1077	0.06	0.05	1222	4.11	Monoterpene
Terpinolene	6.10	1081	0.32	0.31	1226	4.18	Monoterpene
para-Cymenene	6.32	1093	0.01	0.01	1369	6.40	Monoterpene
Linalool	6.63*	1107	0.28	0.22	1499	9.39	Monoterp. alcohol
<i>trans</i> -Sabinene hydrate	6.63*	1107	[0.28]	0.08	1486	9.03	Monoterp. alcohol
Terpinen-4-ol	8.66	1181	0.36	0.33	1529	10.55	Monoterp. alcohol
α -Terpineol	9.34	1204	0.09	0.24	1628	14.79	Monoterp. alcohol
Bicycloelemene	14.76	1316	0.06	0.07	1416	7.33	Sesquiterpene
δ -Elemene	15.02	1320	1.61	1.65	1414	7.30	Sesquiterpene
α -Cubebene	15.64	1330	0.29	0.27	1405	7.06	Sesquiterpene
Cycloisositivene	16.64	1345	0.09	0.06	1410	7.18	Sesquiterpene
α -Copaene	17.40	1357	4.26	4.34	1431	7.70	Sesquiterpene
β -Cubebene	18.29	1370	0.33	0.32	1473	8.75	Sesquiterpene
β -Elemene	18.57	1374	0.33	23.61	1523	10.33*	Sesquiterpene
α -Gurjunene	19.26	1385	0.13	0.12	1461	8.43	Sesquiterpene
β -Caryophyllene	20.48	1403	22.80	[23.61]	1523	10.33*	Sesquiterpene
β -Copaene	21.11	1410	0.15	[23.61]	1523	10.33*	Sesquiterpene
<i>trans</i> - α -Bergamotene	21.67	1417	0.06	[23.61]	1523	10.33*	Sesquiterpene
<i>cis</i> - β -Farnesene	22.54	1427	0.10	1.28	1580	12.50*	Sesquiterpene
α -Humulene	22.98	1433	1.20	[1.28]	1580	12.50*	Sesquiterpene
<i>trans</i> - β -Farnesene	24.10	1446	0.21	0.21	1624	14.57	Sesquiterpene
γ -Muurolene	25.01	1457	0.07	0.10	1607	13.66	Sesquiterpene
Germacrene D	25.15	1459	0.41	0.39	1617	14.17	Sesquiterpene

β-Selinene	25.76	1466	0.39	0.35	1621	14.43	Sesquiterpene
ar-Curcumene	25.93	1468	0.18	0.19	1689	17.98*	Sesquiterpene
α-Selinene	26.39*	1474	0.54	0.27	1637	15.26	Sesquiterpene
Bicyclgermacrene	26.39*	1474	[0.54]	0.28	1641	15.46	Sesquiterpene
α-Muurolene	27.16*	1483	0.62	0.11	1648	15.86	Sesquiterpene
4-epi-Cubebol	27.16*	1483	[0.62]	0.15	1800	25.39	Sesquiterp. alcohol
γ-Cadinene	28.22	1496	0.03	0.04	1665	16.76	Sesquiterpene
β-Bisabolene	28.49	1499	3.31	3.32	1656	16.28	Sesquiterpene
δ-Cadinene	28.94*	1505	2.37	2.16	1672	17.13	Sesquiterpene
Cubebol	28.94*	1505	[2.37]	0.24	1849	29.03	Sesquiterp. alcohol
trans-Calamenene	29.26	1509	0.09	0.08	1730	20.68	Sesquiterpene
α-Cadinene	29.98	1519	0.11	[0.19]	1689	17.98*	Sesquiterpene
trans-α-Bisabolene	30.85	1532	0.04	0.03	1717	19.77	Sesquiterpene
α-Elemol	32.35	1552	0.01	0.02	1997	37.15	Sesquiterp. alcohol
Caryophyllene oxide	33.47	1568	0.54	0.46	1845	28.72	Sesquiterp. ether
Spathulenol	33.65*	1570	0.18	0.08	2017	37.82	Sesquiterp. alcohol
(E)-Nerolidol	33.65*	1570	[0.18]	0.10	1982	36.48	Sesquiterp. alcohol
Isospathulenol	36.86	1627	0.23	0.22	2153	41.86	Sesquiterp. alcohol
τ-Muurolol	37.44	1641	0.17	0.17	2083	39.94	Sesquiterp. alcohol
α-Muurolol	37.58	1644	0.71	0.73	2098	40.39	Sesquiterp. alcohol
Total identified			98.29%	98.29%			

*: 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 : Clear liquid

Refractive index : 1.4823 ± 0.0003 (20 °C)

CONCLUSION

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



