



PLANT THERAPY

100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: B40100

ESSENTIAL OIL: BLACK PEPPER
BOTANICAL NAME: PIPER NIGRUM
ORIGIN: SRI LANKA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BLACK PEPPER	%
β -CARYOPHYLLENE	26.9
LIMONENE	12.7
DELTA-3-CARENE	10.2
β -PINENE	8.0
SABINENE	7.7
α -PINENE	7.5
α -COPAENE	3.0
δ -ELEMENE	2.0
β -MYRCENE	1.6
α -HUMULENE	1.6
α -PHELLANDRENE	1.5
β -PHELLANDRENE + 1,8-CINEOLE	1.5
β -SELINENE	1.4
δ -CADINENE	1.3
β -ELEMENE	1.0
CARYOPHYLLENE EPOXIDE	0.9
α -SELINENE	0.8
GERMACRENE D	0.5

Comments from Robert Tisserand: This is a very good Black Pepper oil with characteristic spicy odor, and the constituents are within expected ranges for Black Pepper oil.

Customer :

PLANT THERAPY
126 Locust Street South
Twin Falls, ID 83 301
USA

Sample nature : ESSENTIAL OIL
Botanical name : PIPER NIGRUM
Reference name : BLACK PEPPER
Batch number : B40100
Origin : SRI LANKA
Part: DRIED FRUIT
Pyrenessences reference : C283
Date of reception : 12/15/2014
Date analysis: 12/23/2014
Packaging: Amber flask of 4 ml - ambient temperature
Wanted analysis: Classic analysis

Report validated by :

Daniel Dantin



GAS CHROMATOGRAPHY (norm NF ISO 11024)

Conditions :

SARL PYRENESSENCES ANALYSES - 2, chemin de la plaine - 11340 Belcaire, FRANCE

TEL: +33 (0)4 68 31 77 83 - Courriel : analyses@pyrenessences.com

SIRET 511 930 869 00017 - Code APE 7490B

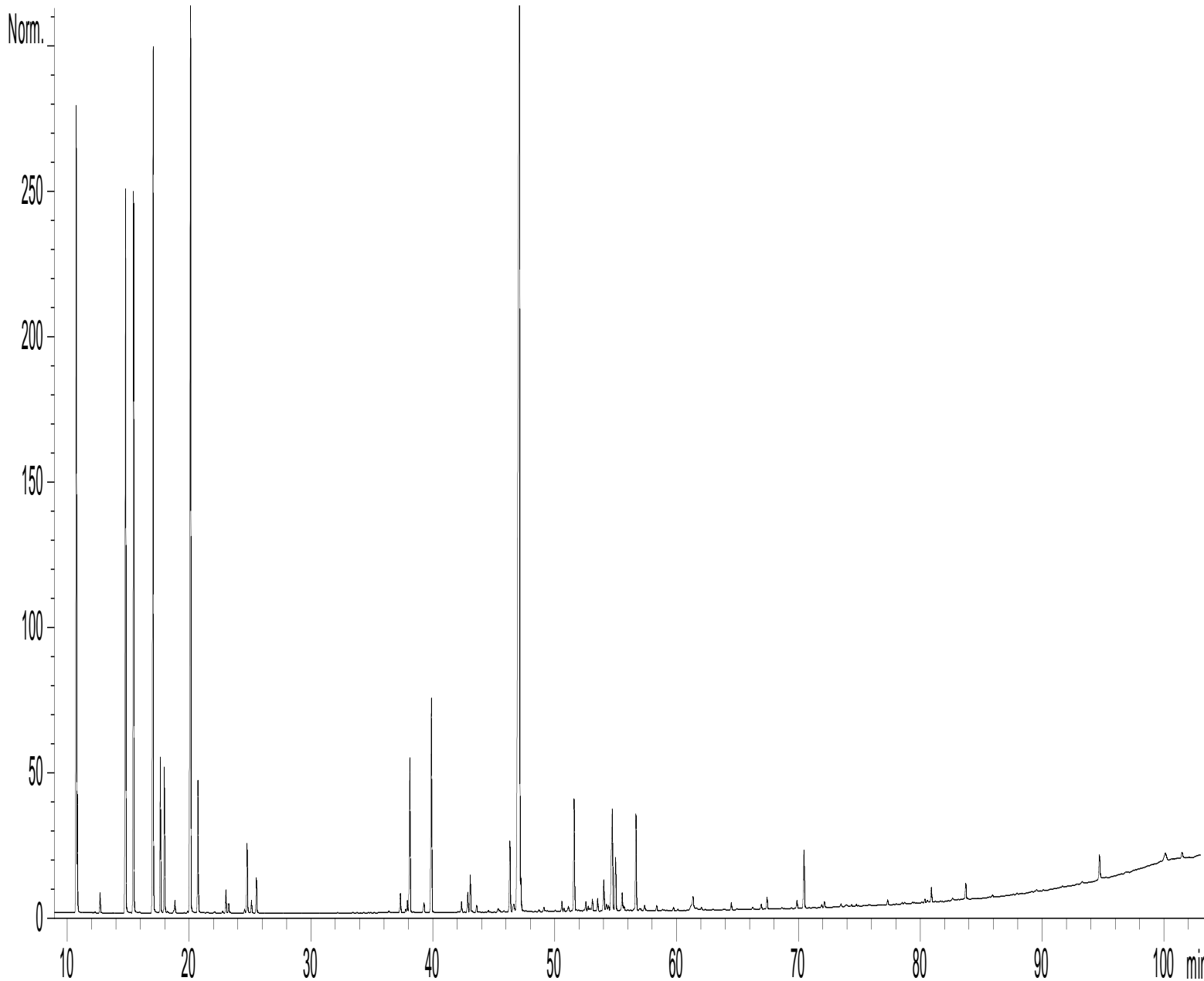
- GC: 7890 - SM : 5975 AGILENT : Column VF WAX polar : 60 m × 0,25 mm × 0,5 µm
- GC/FID 6890 AGILENT : Column VF WAX polar : 60 m × 0,25 mm × 0,5 µm
- Programmation : 6 min to 60°C – 2°C/min → 250°C – 10 min to 250°C
- Carrier gas : He 30 psi/FID ; 23 psi/MS
- Dilution: 10 % in Hexane
- Mass : 30 à 350
- Sample injection : 1 µL

Mass range : 30 to 350, Oil components are identified by a combination of retention times (our own database) and mass spectra library NIST 75 000 records,

Percentages are calculated from GC/FID peaks areas without using corrections factors,

Chromatographic profile (GC/FID) :

FID1 A, (Z:\PLANTHER\PNLSLC283.D)



Identification results 1 – PEPPER BLACK SRI LANKA BATCH B40100

Peak	RT (min)	Compound	%	Norm (%)	Allergens (%)
1	10,2	TRICYCLENE	0,01		
2	10,7	α-PINENE	7,47	10 - 16	
3	10,8	α-THUYENE	0,94		
4	12,3	α-FENCHENE	0,01		
5	12,7	CAMPHENE	0,20		
6	14,8	β-PINENE	8,04	9 - 12	
7	15,4	SABINENE	7,69	10 - 17	
8	15,9	THUYADIENE	0,01		
9	17,0	Δ3-CARENE	10,23	5 - 11	
10	17,6	β-MYRCENE	1,64		
11	18,0	α-PHELLANDRENE	1,54		
12	18,2	ψ-LIMONENE	0,02		
13	18,7	o-CYMENE	0,02		
14	18,8	α-TERPINENE	0,15		
15	19,9	ISOSYLVESTRENE	0,02		
16	20,1	LIMONENE	12,65	13 - 16	12,65
17	20,7	β-PHELLANDRENE + 1,8-CINEOLE	1,53		
18	22,1	Cis-β-OCIMENE	0,02		
19	22,7	TERPENE ISOMER	0,02		
20	23,0	γ-TERPINENE	0,27		
21	23,2	Trans-β-OCIMENE	0,11		
22	24,5	m-CYMENE	0,05		
23	24,7	p-CYMENE	0,82		
24	25,1	ISOTERPINOLENE	0,15		
25	25,5	TERPINOLENE	0,41		
26	36,4	α-p-DIMETHYLSTYRENE	0,03		
27	37,3	α-CUBEBENE	0,25		
28	37,8	ELEMENE ISOMER	0,04		
29	37,9	Trans-THUYANOL	0,14		
30	36,5	δ-ELEMENE	2,01	0,5 – 3	
31	38,4	BICYCLOELEMENE	0,01		
32	39,3	CYCLOSATIVENE	0,15		
33	39,9	α-COPAENE	3,01	1,5 – 4	
34	42,3	CAMPHOR	0,15		
35	42,9	α-GURJUNENE	0,26		
36	43,1	LINALOOL	0,47		0,47
37	43,6	β1-CUBEBENE	0,09		
38	44,5	SESQUITERPENE	0,03		
39	45,3	Cis-p-MENTH-3-EN-7-AL	0,06		
40	45,5	Trans-p-MENTH-2-EN-1-OL	0,03		
41	45,8	ε-CADINENE	0,02		
42	46,3	β-ELEMENE	1,00		
43	46,6	α-GUAIENE	0,16		
44	47,1	β-CARYOPHYLLENE	26,94	12 - 21	
45	47,6	AROMADENDRENE	0,02		

Identification results 2 – PEPPER BLACK SRI LANKA BATCH B40100

Peak	RT (min)	Compound	%	Norm (%)	Allergens (%)
46	48,0	Cis-p-2,8-MENTHADIEN-1-OL	0,02		
47	48,4	MYRTENAL	0,01		
48	48,7	CADINA-3,5-DIENE	0,03		
49	49,1	ALLO-AROMADENDRENE + Trans-PINOCARVEOL	0,07		
50	50,6	E-β-FARNESENE	0,13		
51	50,8	ZONARENE	0,04		
52	51,1	Trans-p-2,8-MENTHADIEN-1-OL	0,07		
53	51,6	α-HUMULENE	1,55		
54	52,0	γ-SELINENE	0,02		
55	52,4	Z-β-FARNESENE	0,01		
56	52,6	γ-MUUROLENE	0,12		
57	52,7	α-TERPINEOL	0,06		
58	52,9	SESQUITERPENE	0,04		
59	53,1	LEDENE	0,16		
60	53,5	GURJUNENE ISOMER	0,17		
61	54,0	GERMACRENE D	0,46	Nd - 1	
62	54,2	SESQUITERPENE	0,10		
63	54,4	CUBEBENE ISOMERE	0,08		
64	54,6	α-MUUROLENE	0,64		
65	54,7	β-SELINENE	1,41	Nd - 2	
66	55,0	α-SELINENE	0,75	0,5 - 2	
67	55,5	BICYCLOGERMACRENE	0,26		
68	55,7	α-FARNESENE	0,06		
69	56,7	δ-CADINENE	1,31		
70	57,0	γ-CADINENE	0,06		
71	57,4	α-BISABOLENE	0,09		
72	58,4	CADINA-1,4-DIENE	0,07		
73	59,7	SABINOL ISOMER	0,04		
74	60,1	SESQUITERPENE Mw=202	0,02		
75	61,4	CALAMENENE	0,39		
76	61,7	p-CYMENE-8-OL	0,04		
77	62,0	Cis-CARVEOL	0,03		
78	64,5	Epi-CUBEBOL	0,09		
79	65,0	Epi-SHYOBUNOL	0,03		
80	66,2	α-CALACORENE	0,03		
81	66,9	HUMULENE EPOXIDE	0,07		
82	67,4	CUBEBOL	0,16		
83	69,9	ISOCARYOPHYLLENE EPOXIDE	0,11		
84	70,5	CARYOPHYLLENE EPOXIDE	0,85	Nd - 1	
85	71,9	SESQUITERPENOL Mw=220	0,04		
86	72,1	NEROLIDOL	0,09		
87	73,5	GERMACRA-1,5-DIEN-4-OL	0,04		
88	73,9	EPOXY-6,7-HUMULENE	0,05		
89	77,3	SPATHULENOL	0,08		
90	79,4	EUGENOL	0,02		0,02

Identification results 3 – PEPPER BLACK SRI LANKA BATCH B40100

Peak	RT (min)	Compound	%	Norm (%)	Allergens (%)
91	80,4	SESQUITERPENOL	0,05		
92	80,6	α -MUUROLOL	0,04		
93	80,9	δ -CADINOL	0,20		
94	82,6	SESQUITERPENOL Mw=220	0,05		
95	83,7	ISOSPATHULENOL	0,23		
96	85,9	CARYOPHYLLA-3,7-DIEN-6-OL	0,04		
97	94,7	13-HEXYLOXACYCLOTRIDEC-10-EN-2-ONE	0,39		
98	101,5	BENZYL BENZOATE	0,01		0,01
		TOTAL	99,87		13,15