
Analytical Report	
Title	**Nutmeg** Essential Oil Profile by GC-MS
Report No.	SE-37270-20
Issue Date	August 31, 2015
Notebook reference	III-29-75
Contributors:	
Quote No.	
Requester	Blue World Naturals LLC

Primary Aim

To identify GC amendable volatile organic compounds present in submitted **Cardamom** essential oil sample.

Samples

The sample arrived as clear liquid with characteristic odor labeled as "Nutmeg lot 11101-a16".

Experimental:

1. Oil was dissolved in methanol to concentration of ~0.1%, 1 ul injected into the GC injector port.

2. GC conditions:

Injector temperature:	250 C
Initial oven temperature:	80 C
Ramp	10 C/min
Final temperature	220 C
Final temperature hold	5 min

3. MS parameters

Ionization and ion polarity	EI+
Scan rate	2 scans/sec
Mass range	35-350 Da
Ion source temperature	150C
Transfer line temperature	280C

4. GC-MS analysis. Waters/Micromass Quatro GC mass spectrometer interfaced to a ThermoElectron Trace gas chromatograph was utilized for the analysis. 30m 0.25 mm ID DB-5 column was used to separate components. Carrier gas was helium at 1.1 ml/min with split ratio of 50.

5. Data treatment.
For each sample, a set of target components was identified with the aid of the AMDIS software[1].The components were identified using the NIST mass spectral library[2].

Deliverables

1. GC-MS chromatogram. GC-MS chromatogram is shown in Appendix I.

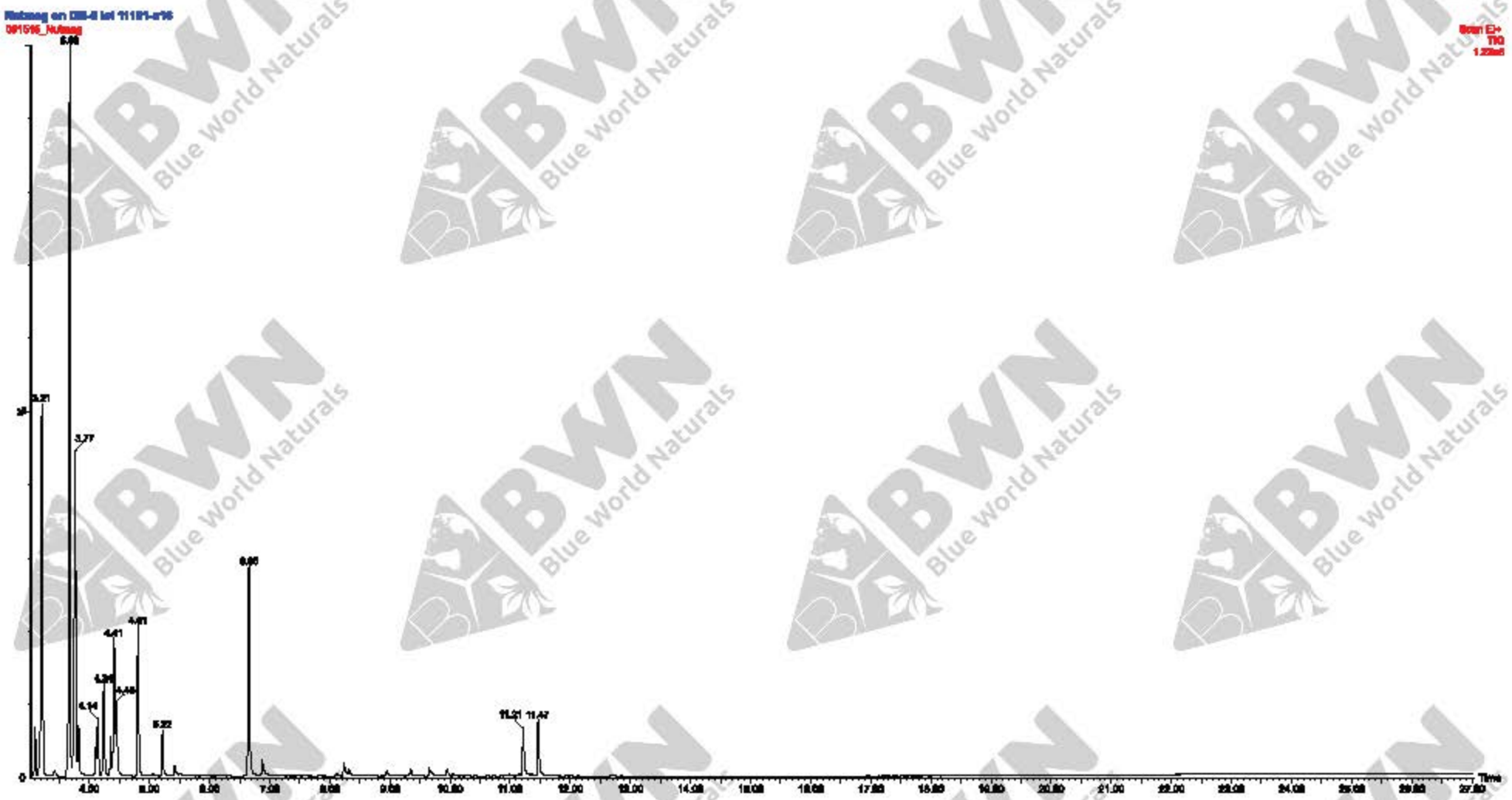
2. Appendix II lists library search results.

- RT Retention Time, time in minutes at which the compound elutes out of column
- CAS. CAS registry number or EPA number.
- Name. IUPAC or common name of identified compound.
- Area. Peak area of a component in %% to total ion count

1 http://chemdata.nist.gov/mass-spc/amdis/
2 http://www.nist.gov/srd/nistla.cfm

APPENDIX I
Nutmeg
GC-MS Chromatogram

Sample "Nutmeg"



APPENDIX II
Nutmeg
Identified Compounds

Nutmeg

CAS	Name	R.T.	Area
28634-89-1	Thujene	3.081	1.6
80-56-8	alpha-pinene	3.189	15.8
79925	Camphene	3.405	0.3
3387415	Bicyclo[3.1.0]hexane, 4-methylene-1-(1-methylethyl)-	3.652	25.6
127913	beta-Pinene	3.743	13.4
123353	ß-Myrcene	3.799	2.2
99832	α-Phellandrene	4.088	0.9
502998	1,3,7-Octatriene, 3,7-dimethyl-	4.122	1.7
99854	1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-	4.221	3.2
527844	Benzene, 1-methyl-2-(1-methylethyl)-	4.338	1.4
138863	Limonene	4.394	4.8
555102	ß-Phellandrene	4.432	2.9
99854	1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-	4.79	6.0
15537550	Bicyclo[3.1.0]hexan-2-ol, 2-methyl-5-(1-methylethyl)-, (1α,2ß,5α)-	5.037	0.1
586629	Cyclohexene, 1-methyl-4-(1-methylethylidene)-	5.196	1.8
EPA-115502	Pyrimidine, 4-butyl-3,4-dihydro-5-methyl-	5.357	0.0
78706	1,6-Octadien-3-ol, 3,7-dimethyl-	5.401	0.5
17699160	Bicyclo[3.1.0]hexan-2-ol, 2-methyl-5-(1-methylethyl)-, (1α,2α,5α)-	5.493	0.1
15537550	Bicyclo[3.1.0]hexan-2-ol, 2-methyl-5-(1-methylethyl)-, (1α,2ß,5α)-	5.846	0.0
562743	3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)-	6.633	9.1
EPA-157899	p-menth-1-en-8-ol	6.86	0.8
92618898	Acetic acid, 1,7,7-trimethyl-bicyclo[2.2.1]hept-2-yl ester	8.101	0.1
94597	1,3-Benzodioxole, 5-(2-propenyl)-	8.22	0.8
20056580	Benzene, 1-methoxy-4-pentyl-	8.302	0.2
20777495	Cyclohexanol, 2-methyl-5-(1-methylethenyl)-, acetate, (1α,2ß,5α)-	8.93	0.3
3856255	Copaene	9.329	0.3
93152	Benzene, 1,2-dimethoxy-4-(2-propenyl)-	9.643	0.5
118650	Bicyclo[7.2.0]undec-4-ene, 4,11,11-trimethyl-8-methylene-,[1R-(1R*,4Z,9S*)]-	9.934	0.3
26560145	1,3,6,10-Dodecatetraene, 3,7,11-trimethyl-, (Z,E)-	10.042	0.1
502998	1,3,7-Octatriene, 3,7-dimethyl-	10.398	0.0
59131134	1,5-Hexadiene, 2,5-dimethyl-3-methylene-	10.892	0.0
18172673	Bicyclo[3.1.1]heptane, 6,6-dimethyl-2-methylene-, (1S)-	10.969	0.1
483761	Naphthalene, 1,2,3,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)-, (1S-cis)-	11.124	0.1
607910	1,3-Benzodioxole, 4-methoxy-6-(2-propenyl)-	11.197	2.4
487116	Benzene, 1,2,3-trimethoxy-5-(2-propenyl)-	11.45	2.5