
Analytical Report	
Title	**Geranium Bourbon** Essential Oil Profile by GC-MS
Report No.	SE-37270-12
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 "Geranium Bourbon lot 11061-b21".

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.

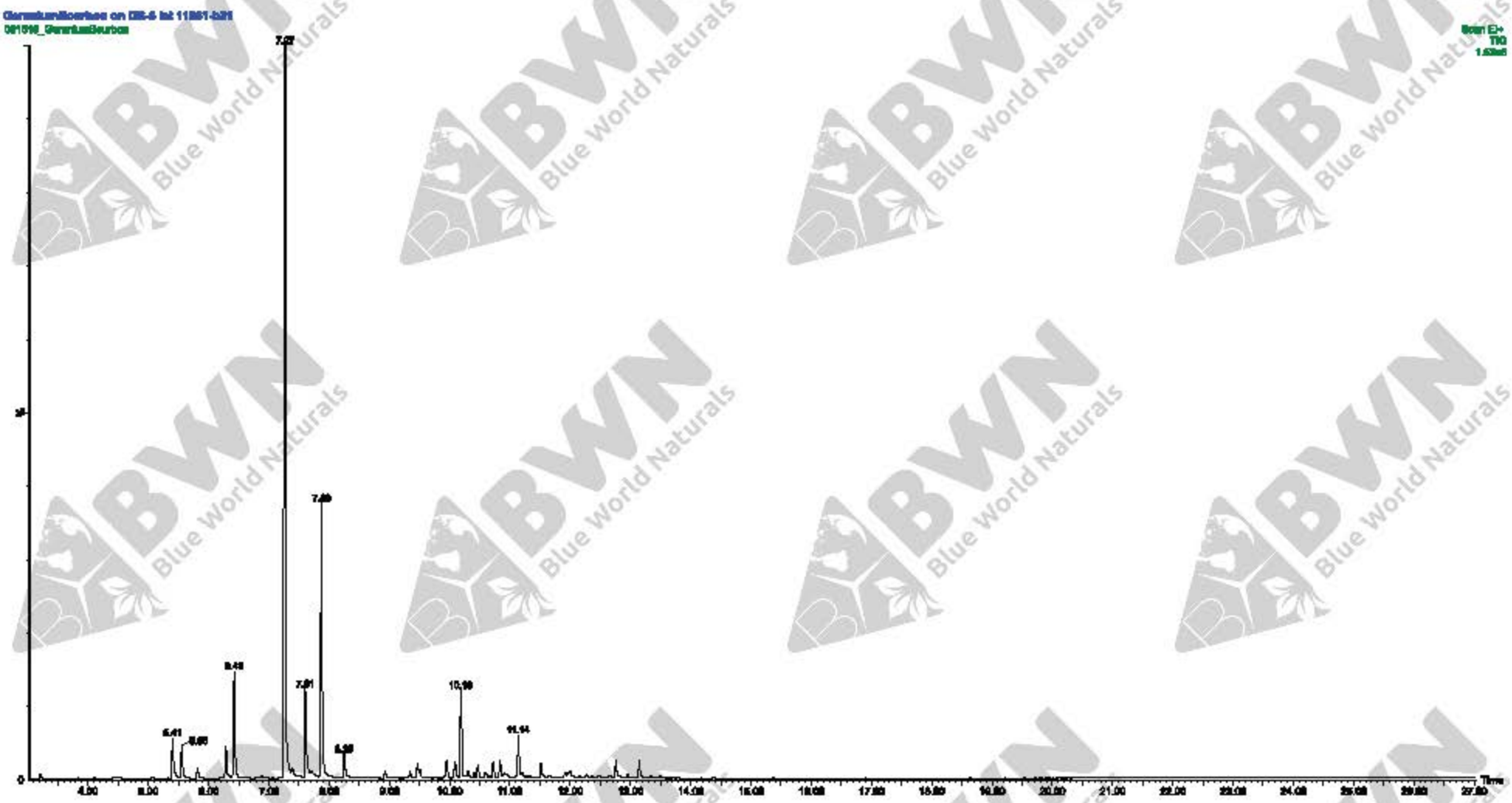
2. Appendix II lists library search results.

- 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
Geranium Bourbon
GC-MS Chromatogram

Sample “Geranium Bourbon”



APPENDIX II
Geranium Bourbon
Identified Compounds

Geranium Bourbon

CAS	Name	R.T.	Area
80-56-8	alpha-pinene	3.191	0.3
78706	1,6-Octadien-3-ol, 3,7-dimethyl-	5.385	2.7
16409431	2H-Pyran, tetrahydro-4-methyl-2-(2-methyl-1-propenyl)-	5.538	1.9
16409431	2H-Pyran, tetrahydro-4-methyl-2-(2-methyl-1-propenyl)-	5.799	0.7
59905532	Isopulegol	6.201	0.0
10458147	Cyclohexanone, 5-methyl-2-(1-methylethyl)-	6.268	1.9
EPA-157899	p-menth-1-en-8-ol	6.872	0.2
106229	6-Octen-1-ol, 3,7-dimethyl-	7.25	46.8
1117619	6-Octen-1-ol, 3,7-dimethyl-, (R)-	7.375	0.6
106252	2,6-Octadien-1-ol, 3,7-dimethyl-, (Z)-	7.586	5.6
106241	2,6-Octadien-1-ol, 3,7-dimethyl-, (E)-	7.697	0.5
105851	6-Octen-1-ol, 3,7-dimethyl-, formate	7.855	15.0
105862	2,6-Octadien-1-ol, 3,7-dimethyl-, formate, (E)-	8.227	1.7
2792394	2,6-Octadiene, 2,6-dimethyl-	8.907	0.4
150845	6-Octen-1-ol, 3,7-dimethyl-, acetate	8.907	0.5
3856255	Copaene	9.327	0.3
5208593	Cyclobuta[1,2:3,4]dicyclopentene, decahydro-3a-methyl-6-methylene-1-(1-methylethyl)-	9.449	0.9
110823682	Cyclohexane, 1-ethenyl-1-methyl-2,4-bis(1-methylethenyl)-	9.492	0.4
118650	Bicyclo[7.2.0]undec-4-ene, 4,11,11-trimethyl-8-methylene-,[1R-(1R*,4Z,9S*)]-	9.932	1.2
141140	6-Octen-1-ol, 3,7-dimethyl-, propanoate	10.067	1.1
489407	1H-Cycloprop[e]azulene, 1a,2,3,4,4a,5,6,7b-octahydro-1,1,4,7-tetramethyl-, [1aR-(1aα,4α,4aß,7bα)]-	10.168	5.4
23986745	1,6-Cyclodecadiene, 1-methyl-5-methylene-8-(1-methylethyl)-, [s-(E,E)]-	10.286	0.4
502998	1,3,7-Octatriene, 3,7-dimethyl-	10.391	0.3
28973979	1,6,10-Dodecatriene, 7,11-dimethyl-3-methylene-, (Z)-	10.448	0.7
23986745	1,6-Cyclodecadiene, 1-methyl-5-methylene-8-(1-methylethyl)-, [s-(E,E)]-	10.569	0.3
EPA-160932	Bicyclo[4.1.0]-3-heptene, 2-isopropenyl-5-isopropyl-7,7-dimethyl-	10.569	0.3
16538888	1,5-Cyclooctadiene, 3-(1-methyl-2-propenyl)-	10.598	0.1
23986745	1,6-Cyclodecadiene, 1-methyl-5-methylene-8-(1-methylethyl)-, [s-(E,E)]-	10.705	0.9
21747466	1H-Cycloprop[e]azulene, 1a,2,3,5,6,7,7a,7b-octahydro-1,1,4,7-tetramethyl-, [1aR-(1aα,7α,7aß,7bα)]-	10.82	1.0
18431828	Spiro[5.5]undec-2-ene, 3,7,7-trimethyl-11-methylene-, (-)-	10.891	0.5
EPA-299118	Butanoic acid, 3-methylbut-2-enyl ester	10.924	0.2
141162	Butanoic acid, 3,7-dimethyl-6-octenyl ester	11.121	2.1
483772	Naphthalene, 1,2,3,4-tetrahydro-1,6-dimethyl-4-(1-methylethyl)-, (1S-cis)-	11.184	0.1
2345268	Propanoic acid, 2-methyl-, 3,7-dimethyl-2,6-octadienyl ester, (E)-	11.498	0.8
77143318	4-(1,3,3-Trimethyl-bicyclo[4.1.0]hept-2-yl)-but-3-en-2-one	11.901	0.2
42078659	2-Butenoic acid, 3-methyl-, 2-phenylethyl ester	11.941	0.6

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55719852	Phenyl ethyl tiglate	11.947	0.1
1118270	Butanoic acid, 3-methyl-, 1-ethenyl-1,5-dimethyl-4-hexenyl ester	11.988	0.2
105908	2,6-Octadien-1-ol, 3,7-dimethyl-, propanoate, (E)-	11.988	0.4
18479486	5-Hepten-1-ol, 2-ethenyl-6-methyl-	12.257	0.1
141140	6-Octen-1-ol, 3,7-dimethyl-, propanoate	12.257	0.1
21284220	Cubenol	12.456	0.1
23178883	3-Cyclohexene-1-methanol, α,4-dimethyl-α-(4-methyl-3-pentenyl)-, [R-(R*,R*)]-	12.64	0.1
105851	6-Octen-1-ol, 3,7-dimethyl-, formate	12.737	1.0
141162	Butanoic acid, 3,7-dimethyl-6-octenyl ester	12.938	0.2
7785333	Geranyl tiglate	13.127	1.1
2345268	Propanoic acid, 2-methyl-, 3,7-dimethyl-2,6-octadienyl ester, (E)-	13.301	0.1