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**Analytical Report**

Title	Lime Persian Tahiti Essential Oil Profile by GC-MS
Report No.	SE-37270-19
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 "Lime Persian Tahiti lot 11084-b42-1".

**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

Report SE-37270-19 Lemon Sicily

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<sup>1</sup>. The components were identified using the NIST mass spectral library<sup>2</sup>.

### 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/nist1a.cfm>

APPENDIX I  
Lime Persian Tahiti  
GC-MS Chromatogram

# Sample "Lime Persian/Tahiti"

Lime Persian/Tahiti on 04-8 lot 11004-0-02-1  
001010\_LimePersianTahiti



APPENDIX II  
Lime Persian Tahiti  
Identified Compounds

## Lime Persian Tahiti

CAS	Name	R.T.	Area
28634-89-1	Thujene	3.08	0.2
80-56-8	alpha-pinene	3.186	1.7
79925	Camphene	3.403	0.1
3387415	Bicyclo[3.1.0]hexane, 4-methylene-1-(1-methylethyl)-	3.646	1.7
127913	beta-Pinene	3.738	12.7
123353	$\beta$ -Myrcene	3.799	1.2
470677	7-Oxabicyclo[2.2.1]heptane, 1-methyl-4-(1-methylethyl)-	4.208	0.1
99805900	Cyclohexene, 4-methyl-3-(1-methylethylidene)-	4.231	0.1
99865	1,3-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-	4.231	0.1
527844	Benzene, 1-methyl-2-(1-methylethyl)-	4.333	0.3
138863	Limonene	4.4	68.0
470826	Eucalyptol	4.455	0.1
99854	1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-	4.787	8.8
99805900	Cyclohexene, 4-methyl-3-(1-methylethylidene)-	5.201	0.4
98555	3-Cyclohexene-1-methanol, $\alpha,\alpha$ -trimethyl-	6.882	0.1
106263	2 $\beta$ -Octadienal, 3,7-dimethyl-, (Z)-	7.461	0.6
68701995	1 $\beta$ -Heptadiene, 3,5-dimethyl-	7.634	0.0
6141680	Furan, 2-(1,1-dimethylethyl)-4-methyl-	7.687	0.0
6141680	Furan, 2-(1,1-dimethylethyl)-4-methyl-	7.762	0.0
106263	2 $\beta$ -Octadienal, 3,7-dimethyl-, (Z)-	7.871	0.6
2436900	Dihydromyrcene	8.091	0.1
3683225	2-Hexene, 4-methyl-, (E)-	8.381	0.0
EPA-223158	trans-3-Cyclopropyl-7-(2-methoxyethyl)norcarane	8.552	0.1
EPA-190705	4 $\beta$ -Dimethyl-nona-3,8-dien-2-one	8.682	0.3
141128	2 $\beta$ -Octadien-1-ol, 3,7-dimethyl-, acetate, (Z)-	9.031	1.1
141128	2 $\beta$ -Octadien-1-ol, 3,7-dimethyl-, acetate, (Z)-	9.311	0.2
118650	Bicyclo[7.2.0]undec-4-ene, 4,11,11-trimethyl-8-methylene-, [1R-(1R*,4Z,9S*)]-	9.933	0.4
26560145	1,3 $\beta$ ,10-Dodecatetraene, 3,7,11-trimethyl-, (Z,E)-	10.036	0.4
65811178	Bicyclo[5.2.0]non-1-ene	10.394	0.0
26560145	1,3 $\beta$ ,10-Dodecatetraene, 3,7,11-trimethyl-, (Z,E)-	10.887	0.0
495614	Cyclohexene, 1-methyl-4-(5-methyl-1-methylene-4-hexenyl)-, (S)-	10.964	0.5