
Analytical Report	
Title	**Ginger Root CO2** Essential Oil Profile by GC-MS
Report No.	SE-37270-13
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 "Ginger Root CO2 lot 11233-f21".

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.

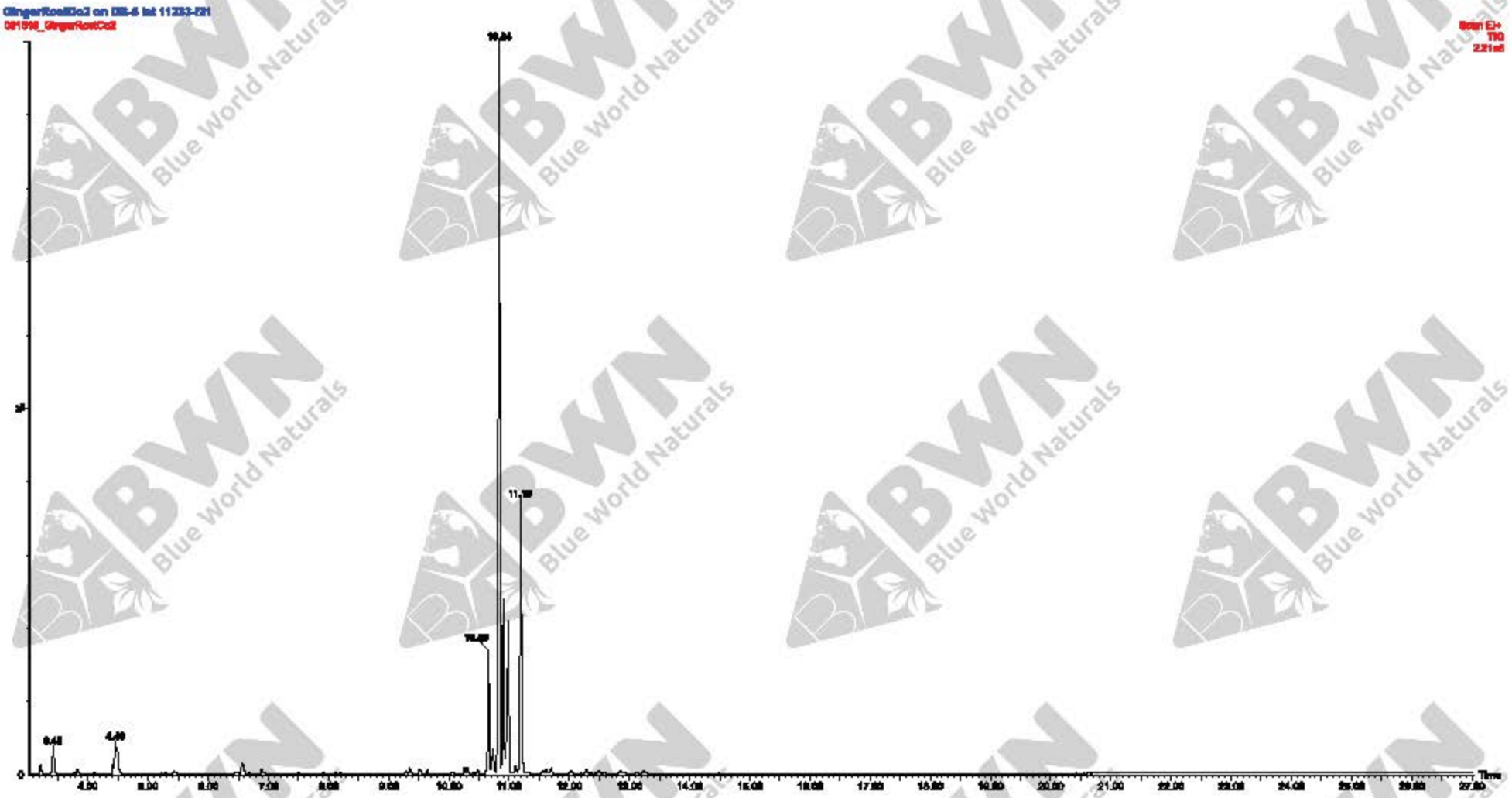
2. Appendix II lists library search results.

- 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
Ginger Root CO2
GC-MS Chromatogram

Sample “Ginger Root CO2”



APPENDIX II
Ginger Root CO2
Identified Compounds

Ginger Root CO2

CAS	Name	R.T.	Area
80-56-8	alpha-pinene	3.193	0.5
79925	Camphene	3.407	1.9
127913	beta-Pinene	3.748	0.1
123353	ß-Myrcene	3.809	0.2
99832	α-Phellandrene	4.094	0.1
138863	Limonene	4.4	0.4
555102	ß-Phellandrene	4.435	1.5
470826	Eucalyptol	4.468	1.8
78706	1,6-Octadien-3-ol, 3,7-dimethyl-	5.408	0.2
464482	Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-, (1S)-	6.206	0.1
124765	Isoborneol	6.547	0.8
EPA-157899	p-menth-1-en-8-ol	6.867	0.4
563791	2-Butene, 2,3-dimethyl-	7.885	0.1
111137	2-Octanone	8.177	0.1
105420	2-Hexanone, 4-methyl-	8.177	0.0
586630	Cyclohexene, 3-methyl-6-(1-methylethylidene)-	8.767	0.0
EPA-109881	(+)-Cycloisosativene	9.267	0.1
3856255	Copaene	9.331	0.3
110823682	Cyclohexane, 1-ethenyl-1-methyl-2,4-bis(1-methylethenyl)-	9.494	0.3
495603	1,3-Cyclohexadiene, 5-(1,5-dimethyl-4-hexenyl)-2-methyl-, [S-(R*,S*)]-	9.62	0.2
26560145	1,3,6,10-Dodecatetraene, 3,7,11-trimethyl-, (Z,E)-	10.043	0.1
18794848	1,6,10-Dodecatriene, 7,11-dimethyl-3-methylene-, (E)-	10.238	0.3
20307839	Cyclohexene, 3-(1,5-dimethyl-4-hexenyl)-6-methylene-, [S-(R*,S*)]-	10.289	0.3
502998	1,3,7-Octatriene, 3,7-dimethyl-	10.396	0.0
109119917	Aromadendrene	10.456	0.3
644304	Benzene, 1-(1,5-dimethyl-4-hexenyl)-4-methyl-	10.639	6.1
23986745	1,6-Cyclodecadiene, 1-methyl-5-methylene-8-(1-methylethyl)-, [s-(E,E)]-	10.709	1.3
495603	1,3-Cyclohexadiene, 5-(1,5-dimethyl-4-hexenyl)-2-methyl-, [S-(R*,S*)]-	10.818	39.7
502614	α-Farnesene	10.881	8.1
123353	ß-Myrcene	10.968	8.1
495614	Cyclohexene, 1-methyl-4-(5-methyl-1-methylene-4-hexenyl)-, (S)-	10.968	10.0
13744155	1H-Cyclopenta[1,3]cyclopropa[1,2]benzene, octahydro-7-methyl-3-methylene-4-(1-methylethyl)-	11.088	0.3
20307839	Cyclohexene, 3-(1,5-dimethyl-4-hexenyl)-6-methylene-, [S-(R*,S*)]-	11.177	14.9
142507	1,6,10-Dodecatrien-3-ol, 3,7,11-trimethyl-, [S-(Z)]-	11.6	0.2
339154915	τ-Elemene	11.686	0.4
515695	α-Bisabolol	12.002	0.2

Ginger Root CO2

28973979	1,6,10-Dodecatriene, 7,11-dimethyl-3-methylene-, (Z)-	12.27	0.3
26560145	1,3,6,10-Dodecatetraene, 3,7,11-trimethyl-, (Z,E)-	12.474	0.1
473154	2-Naphthalenemethanol, decahydro-α,α,4a-trimethyl-8-methylene-, [2R-(2α,4aα,8aß)]-	12.828	0.2