
Analytical Report	
Title	**Cardamom** Essential Oil Profile by GC-MS
Report No.	SE-37270-4
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Contributors:	
Quote No.	
Requester	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 "Cardamom lot 11020-a15".

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.

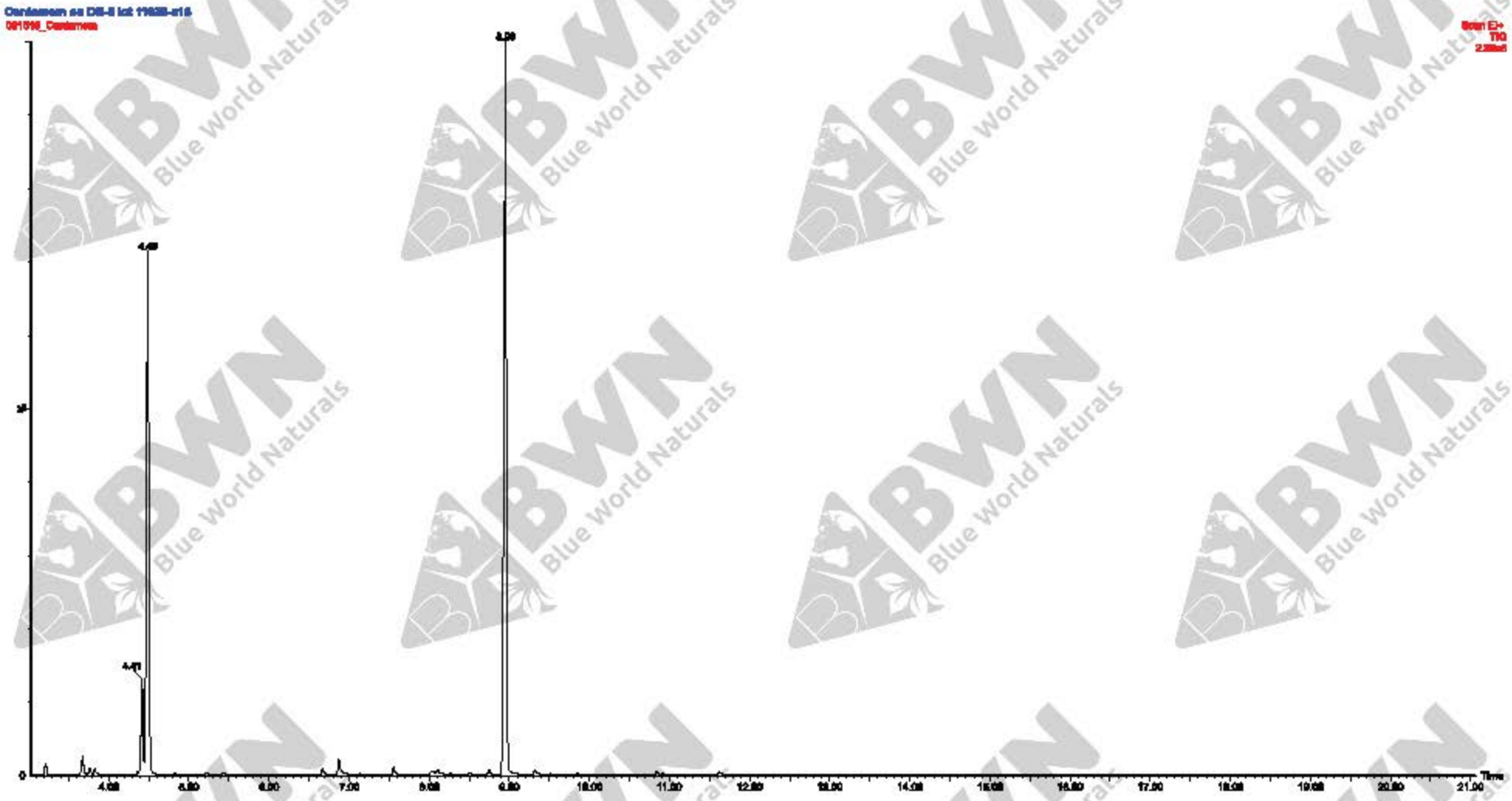
2. Appendix II lists library search results.

- 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
Cardamom
GC-MS Chromatogram

Sample “Cardamom”



APPENDIX II
Cardamom
Identified Compounds

Cardamon

CAS	Name	R.T.	Area
80-56-8	alpha-pinene	3.192	0.7
3387415	Bicyclo[3.1.0]hexane, 4-methylene-1-(1-methylethyl)-	3.653	1.0
80-56-8	beta-Pinene	3.745	0.4
123353	ß-Myrcene	3.807	0.4
99865	1,3-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-	4.232	0.0
527844	Benzene, 1-methyl-2-(1-methylethyl)-	4.34	0.1
138863	Limonene	4.394	5.6
470826	Eucalyptol	4.468	36.2
99854	1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-	4.804	0.1
15537550	Bicyclo[3.1.0]hexan-2-ol, 2-methyl-5-(1-methylethyl)-, (1α,2ß,5α)-	5.037	0.0
586629	Cyclohexene, 1-methyl-4-(1-methylethylidene)-	5.203	0.2
78706	1,6-Octadien-3-ol, 3,7-dimethyl-	5.41	0.2
562743	3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)-	6.649	0.4
98555	3-Cyclohexene-1-methanol, α,α4-trimethyl-	6.853	1.2
7149260	1,6-Octadien-3-ol, 3,7-dimethyl-, 2-aminobenzoate	7.536	0.5
10198239	Cyclohexanol, 1-methyl-4-(1-methylethenyl)-, acetate	8.008	0.2
92618898	Acetic acid, 1,7,7-trimethyl-bicyclo[2.2.1]hept-2-yl ester	8.089	0.4
4821049	3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)-, acetate	8.244	0.1
502998	1,3,7-Octatriene, 3,7-dimethyl-	8.487	0.1
20777495	Cyclohexanol, 2-methyl-5-(1-methylethenyl)-, acetate, (1α,2ß,5α)-	8.729	0.3
80262	3-Cyclohexene-1-methanol, α,α,4-trimethyl-, acetate	8.932	51.2
141128	2,6-Octadien-1-ol, 3,7-dimethyl-, acetate, (Z)-	9.3	0.3
473132	Naphthalene, 1,2,3,4,4a,5,6,8a-octahydro-4a,8-dimethyl-2-(1-methylethenyl)-, [2R-(2α,4aα,8aß)]-	10.82	0.2
17066670	Naphthalene, decahydro-4a-methyl-1-methylene-7-(1-methylethenyl)-, [4aR-(4aα,7α,8aß)]-	10.902	0.1
142507	1,6,10-Dodecatrien-3-ol, 3,7,11-trimethyl-, [S-(Z)]-	11.603	0.2