
Analytical Report	
Title	**Juniper Berry** Essential Oil Profile by GC-MS
Report No.	SE-37270-15
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 "GJuniper Berry lot 11072-e18-1".

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

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.

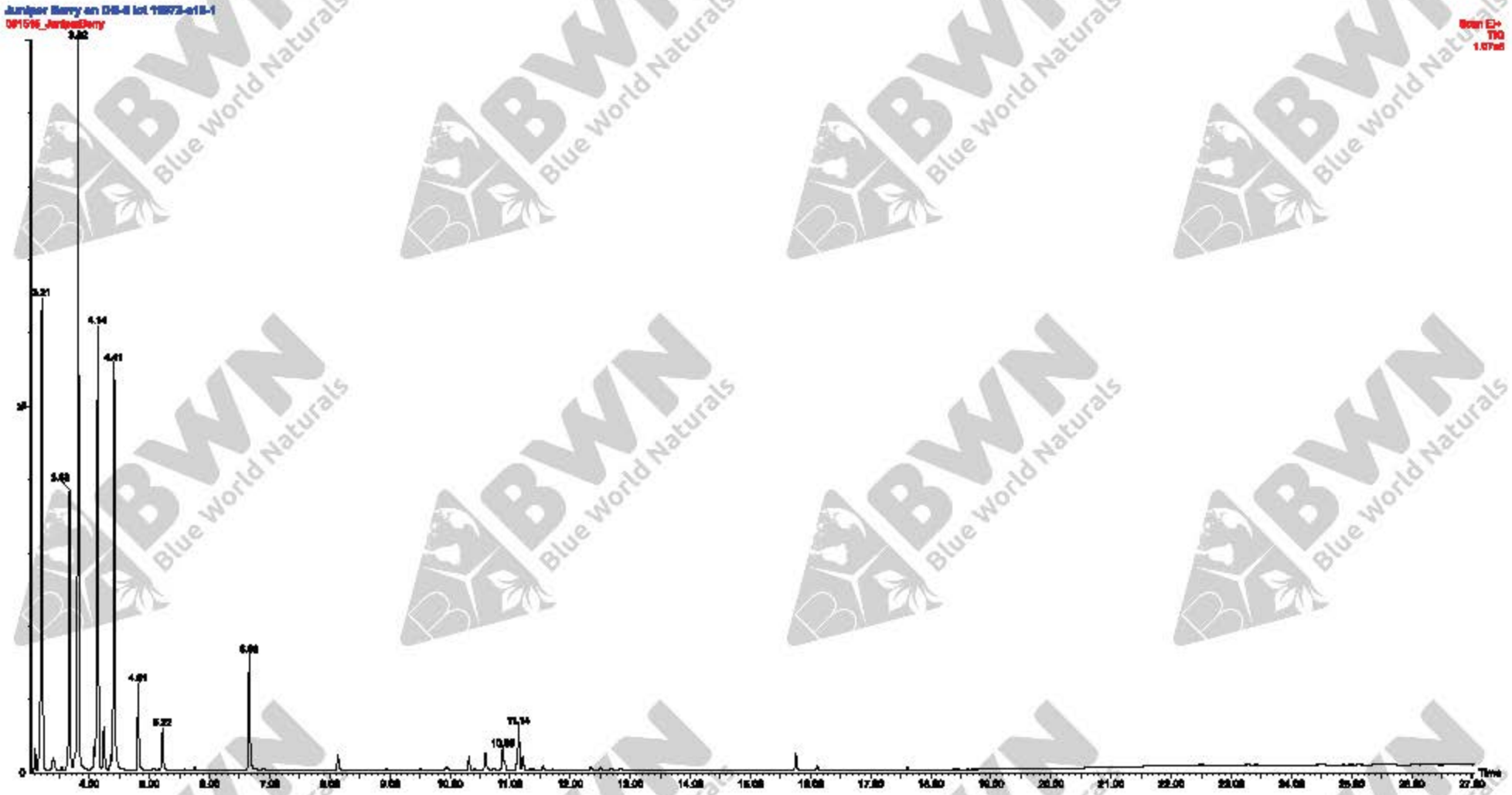
2. Appendix II lists library search results.

- 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
Juniper Berry
GC-MS Chromatogram

Sample “Juniper Berry”



APPENDIX II
Juniper Berry
Identified Compounds

Juniper Berry

CAS	Name	R.T.	Area
28634-89-1	Thujene	3.079	0.6
80-56-8	alpha-pinene	3.188	18.0
471841	Bicyclo[2.2.1]heptane, 7,7-dimethyl-2-methylene-	3.378	0.7
79925	Camphene	3.523	0.1
3387415	Bicyclo[3.1.0]hexane, 4-methylene-1-(1-methylethyl)-	3.65	10.1
1678826	Cyclohexane, 1-methyl-4-(1-methylethyl)-, trans-	3.719	0.0
123353	beta-Pinene	3.796	21.8
499978	Cyclohexane, 1-methylene-4-(1-methylethenyl)-	4.056	0.6
2437958	Bicyclo[3.1.1]hept-2-ene, 2,6,6-trimethyl-, (±)-	4.121	15.1
99865	1,3-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-	4.225	1.6
527844	Benzene, 1-methyl-2-(1-methylethyl)-	4.337	0.3
138863	Limonene	4.394	14.4
555102	ß-Phellandrene	4.429	0.4
99854	1,4-Cyclohexadiene, 1-methyl-4-(1-methylethyl)-	4.793	2.8
15402945	Cycloheptene, 5-ethylidene-1-methyl-	5.054	0.1
EPA-162254	Cyclopentene, 3-isopropenyl-5,5-dimethyl-	5.141	0.0
586629	Cyclohexene, 1-methyl-4-(1-methylethylidene)-	5.197	1.5
471158	Bicyclo[3.1.0]hexan-3-one, 4-methyl-1-(1-methylethyl)-, [1S-(1α,4ß,5α)]-	5.728	0.1
562743	3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)-	6.638	4.3
5986389	5,7-Octadien-2-ol, 2,6-dimethyl-	6.881	0.1
EPA-149856	(-)-Myrtenyl acetate	8.119	0.7
23986745	1,6-Cyclodecadiene, 1-methyl-5-methylene-8-(1-methylethyl)-, [s-(E,E)]-	8.923	0.1
28973979	1,6,10-Dodecatriene, 7,11-dimethyl-3-methylene-, (Z)- or isomer	9.933	0.2
28973979	1,6,10-Dodecatriene, 7,11-dimethyl-3-methylene-, (Z)- or isomer	9.933	0.2
17699148	α-Cubebene	10.298	0.6
502998	1,3,7-Octatriene, 3,7-dimethyl-	10.398	0.1
483761	Naphthalene, 1,2,3,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)-, (1S-cis)-	10.568	0.7
23986745	1,6-Cyclodecadiene, 1-methyl-5-methylene-8-(1-methylethyl)-, [s-(E,E)]-	10.711	0.1
13744155	1H-Cyclopenta[1,3]cyclopropa[1,2]benzene, octahydro-7-methyl-3-methylene-4-(1-methylethyl)-	10.858	0.9
31983229	Naphthalene, 1,2,4a,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)- or isomer	10.892	0.3
483750	Naphthalene, 1,2,4a,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)- or isomer	11.09	0.1
483761	Naphthalene, 1,2,3,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)-, (1S-cis)- or isomer	11.124	1.8
483761	Naphthalene, 1,2,3,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)-, (1S-cis)- or isomer	11.195	0.6
16728997	Naphthalene, 1,2,3,4,4a,7-hexahydro-1,6-dimethyl-4-(1-methylethyl)-	11.317	0.1
639996	Cyclohexanemethanol, 4-ethenyl-α,α,4-trimethyl-3-(1-methylethenyl)-, [1R-(1α,3α,4ß)]-	11.529	0.2
74663835	1,5-Heptadiene, 2,5-dimethyl-3-methylene-	11.686	0.0

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EPA-156228	Epicedrol	12.329	0.2
21284220	Cubenol	12.483	0.1
19912620	.tau.-Muurolol	12.644	0.1
481345	α-Cadinol	12.803	0.1
77129487	1,6,10-Dodecatriene, 7,11-dimethyl-3-methylene-	15.737	0.6