
Analytical Report	
Title	**Clove Bud** Essential Oil Profile by GC-MS
Report No.	SE-37270-9
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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 "Clove Bud lot 11038-27".

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.

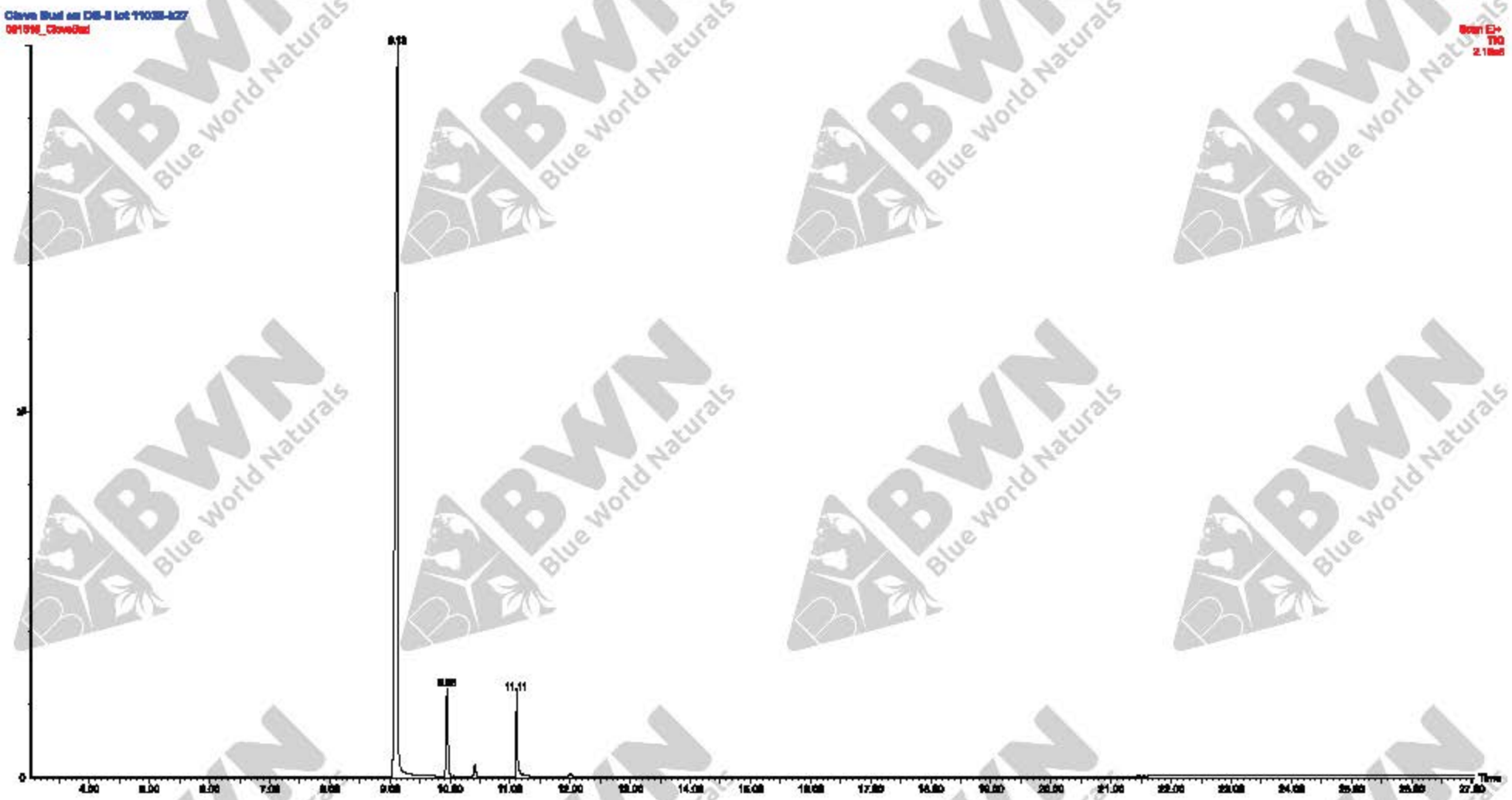
2. Appendix II lists library search results.

- 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
Clove Bud
GC-MS Chromatogram

Sample “Clove Bud”



APPENDIX II
Clove Bud
Identified Compounds

Clove Bud

CAS	Name	R.T.	Area
17699148	α-Cubebene	8.929	0.0
97530	Eugenol	9.105	86.6
23986745	1,6-Cyclodecadiene, 1-methyl-5-methylene-8-(1-methylethyl)-, [s-(E,E)]-	9.325	0.1
17699148	α-Cubebene	9.325	0.1
118650	Bicyclo[7.2.0]undec-4-ene, 4,11,11-trimethyl-8-methylene-,[1R-(1R*,4Z,9S*)]-	9.932	6.6
97541	Phenol, 2-methoxy-4-(1-propenyl)-	10.137	0.0
6753986	α-Caryophyllene	10.397	1.0
26560145	1,3,6,10-Dodecatetraene, 3,7,11-trimethyl-, (Z,E)-	10.898	0.0
93287	Phenol, 2-methoxy-4-(2-propenyl)-, acetate	11.091	5.2
483761	Naphthalene, 1,2,3,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)-, (1S-cis)-	11.125	0.1
483772	Naphthalene, 1,2,3,4-tetrahydro-1,6-dimethyl-4-(1-methylethyl)-, (1S-cis)-	11.19	0.1
483772	Naphthalene, 1,2,3,4-tetrahydro-1,6-dimethyl-4-(1-methylethyl)-, (1S-cis)-	11.19	0.0
1139306	Caryophyllene oxide	11.986	0.3