



PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: CH0105

ESSENTIAL OIL: CLOVE BUD ORGANIC
BOTANICAL NAME: SYZYGIVM AROMATICUM
ORIGIN: SRI LANKA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CLOVE BUD ORGANIC OIL	%
EUGENOL	79.9
EUGENYL ACETATE	10.1
β -CARYOPHYLLENE	6.7

Comments from Robert Tisserand: Fresh, sweet-spicy odor quality. All three key ISO constituents are within range.

Date : September 27, 2018

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18I20-PTH2-1-CC

Customer identification : Clove Bud Organic - Sri Lanka - CH010584R

Type : Essential oil

Source : *Syzygium aromaticum*

Customer : Plant Therapy

ANALYSIS

Method: PC-PA-014-17J19 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Lindsay Girard, B. Sc.

Analysis date : September 21, 2018

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.5343 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Furfural	0.03	0.03	Aliphatic alcohol
α -Pinene	0.01	tr	Monoterpene
6-Methyl-5-hepten-2-one	0.01	tr	Aliphatic ketone
Myrcene	0.01		Monoterpene
Limonene	0.01	0.01	Monoterpene
Terpinolene	0.01		Monoterpene
Linalool	0.01	0.01	Monoterpenic alcohol
(E)-4,8-Dimethylnona-1,3,7-triene	0.01	0.01	Terpene derivative
Methyl salicylate	0.07	0.08	Phenolic ester
Chavicol	0.12	0.14	Phenylpropanoid
α -Cubebene	0.08	0.08	Sesquiterpene
Eugenol	79.89	79.98	Phenylpropanoid
Dihydroeugenol	0.22	0.24	Phenylpropanoid
α -Copaene	0.15	0.16	Sesquiterpene
β -Elemene	0.01	6.84*	Sesquiterpene
Vanillin	0.01		Simple phenolic
Isocaryophyllene	0.03	0.03	Sesquiterpene
Methyleugenol	0.07	0.05	Phenylpropanoid
β -Caryophyllene	6.73	[6.84]*	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.02	0.02	Sesquiterpene
α -Humulene	0.57	0.52	Sesquiterpene
allo-Aromadendrene	0.01	0.02	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.03	0.03	Sesquiterpene
γ -Muurolene	0.02	0.02*	Sesquiterpene
Germacrene D	0.01	0.01	Sesquiterpene
β -Selinene	0.01	0.01	Sesquiterpene
δ -Selinene	0.01	[0.02]*	Sesquiterpene
α -Muurolene	0.02	0.01	Sesquiterpene
γ -Cadinene	0.03	0.02	Sesquiterpene
<i>trans</i> -Calamenene	0.08	0.08	Sesquiterpene
δ -Cadinene	0.16	0.15	Sesquiterpene
Eugenyl acetate	10.13	10.20	Phenylpropanoid ester
Unknown	0.03	0.02	Unknown
Unknown	0.04		Phenylpropanoid
Caryophyllenyl alcohol	0.04	0.03	Sesquiterpenic alcohol
Caryophyllene oxide	0.44*	0.37	Sesquiterpenic ether
Caryophyllene oxide isomer	[0.44]*	0.04	Sesquiterpenic ether
Unknown	[0.44]*	0.01	Oxygenated sesquiterpene
Unknown	0.02		Unknown
Humulene epoxide I	0.01	0.01	Sesquiterpenic ether
Humulene epoxide II	0.04	0.05*	Sesquiterpenic ether
(E)-Isoeugenyl acetate	0.02		Phenylpropanoid ester
1,10-diepi-Cubenol	0.01	[0.05]*	Sesquiterpenic alcohol
Caryophylladienol I	0.04	0.05	Sesquiterpenic alcohol
Caryophylladienol II	0.03		Sesquiterpenic alcohol
Cubenol	0.05	0.01	Sesquiterpenic alcohol
τ -Muurolol	0.03	0.04	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(E)-caryophyllene	0.07	0.05	Sesquiterpenic alcohol

14-Hydroxy-(<i>E</i>)-caryophyllene	0.07	0.06	Sesquiterpenic alcohol
(<i>E</i>)-Coniferyl alcohol	0.04		Phenylpropanoid
(<i>E</i>)-4-(3-Hydroxy-1-propenyl)-2-methoxyphenyl acetate	0.03		Phenylpropanoid ester
Total identified	99.48%	99.47%	

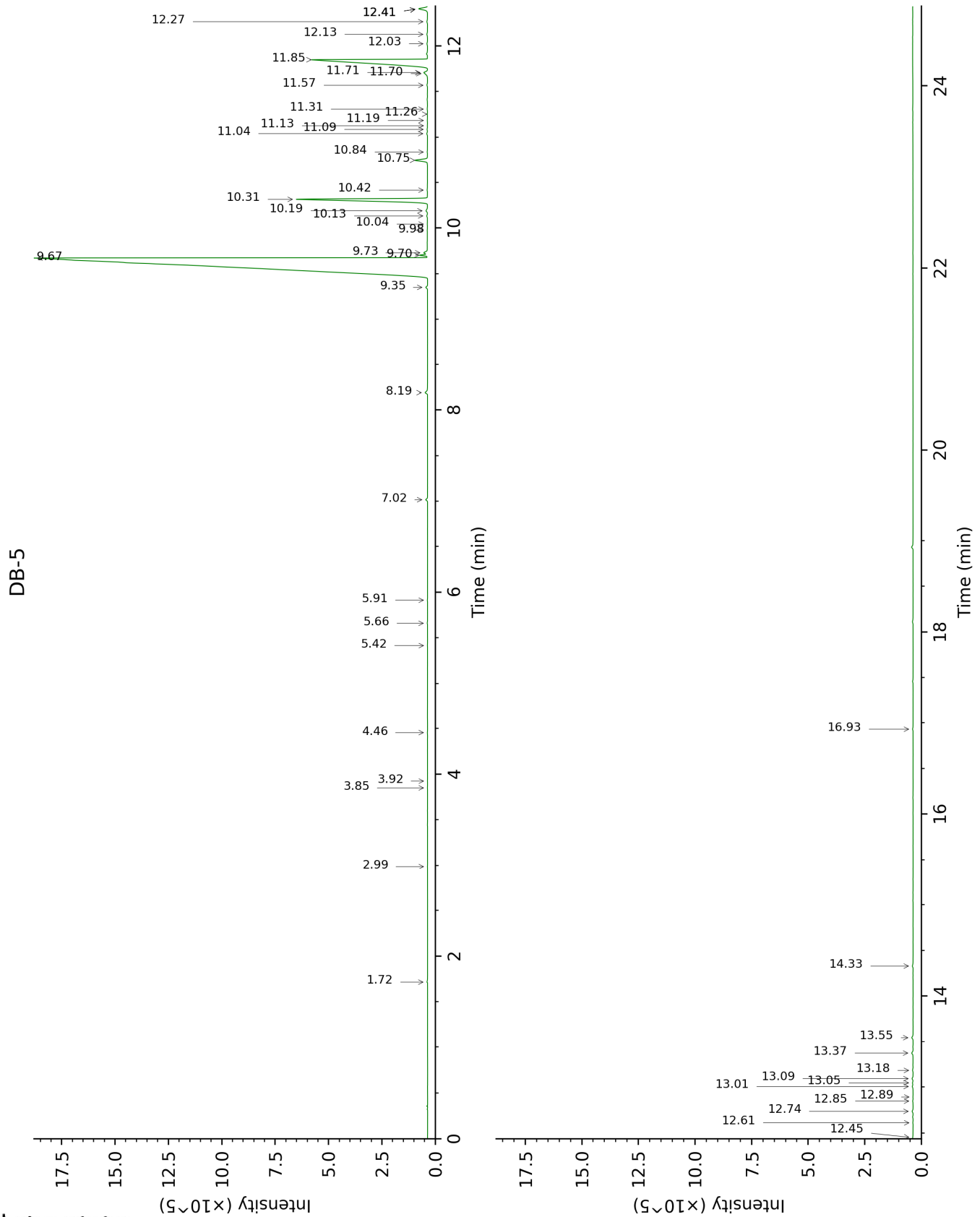
*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

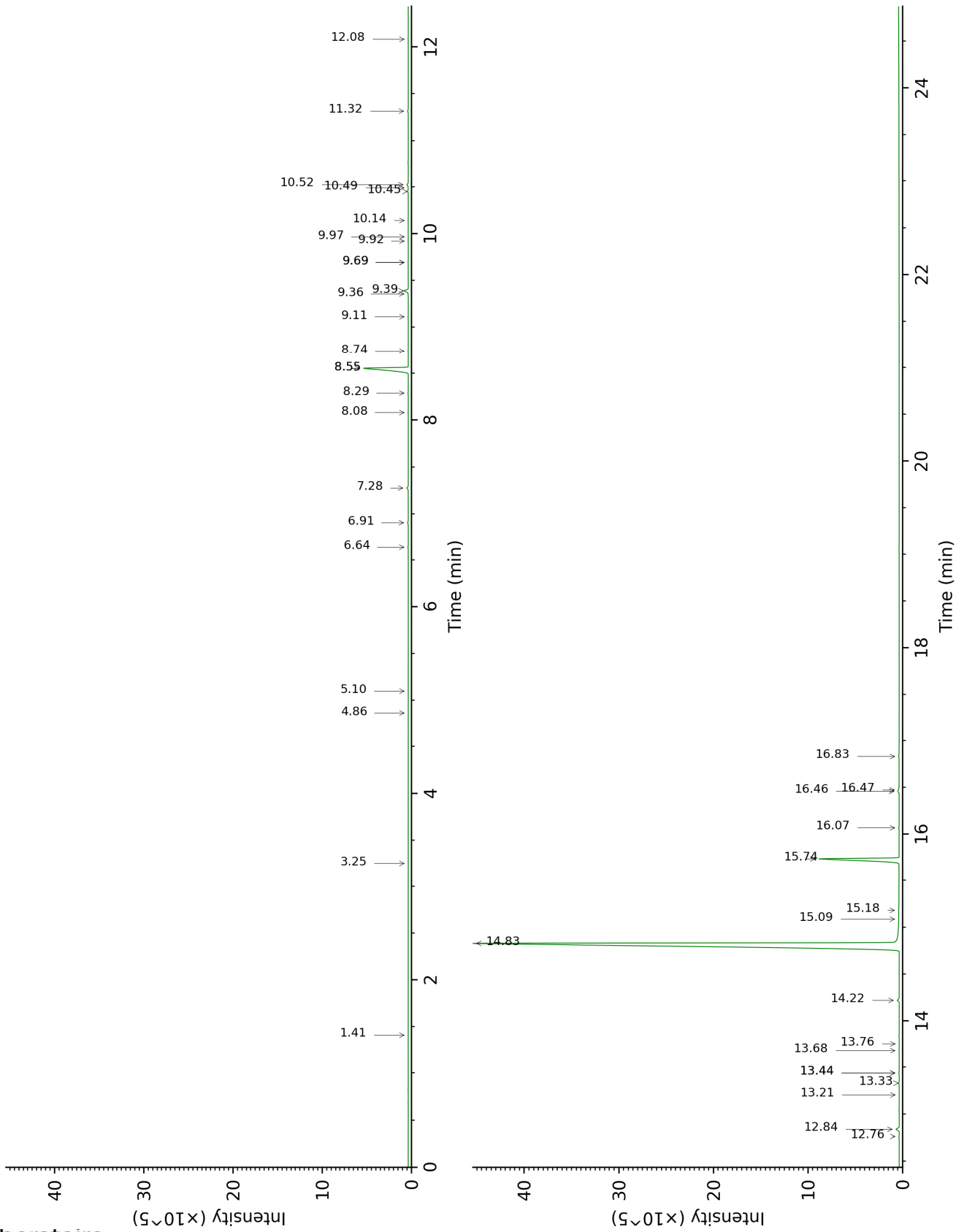
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

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DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Furfural	1.72	827	0.03	6.64	1406	0.03
α-Pinene	2.99	928	0.01	1.41	995	tr
6-Methyl-5-hepten-2-one	3.85	986	0.01	5.10	1296	tr
Myrcene	3.92	991	0.01			
Limonene	4.46	1026	0.01	3.25	1162	0.01
Terpinolene	5.42	1086	0.01			
Linalool	5.66	1101	0.01	8.08	1513	0.01
(E)-4,8-Dimethylnona-1,3,7-triene	5.91	1118	0.01	4.86	1279	0.01
Methyl salicylate	7.02	1189	0.07	10.45	1701	0.08
Chavicol	8.19	1267	0.12	16.46	2262	0.14
α-Cubebene	9.35	1347	0.08	6.91	1426	0.08
Eugenol	9.67	1369	79.89	14.83	2096	79.98
Dihydroeugenol	9.70	1371	0.22	14.22	2038	0.24
α-Copaene	9.73	1373	0.15	7.28	1453	0.16
β-Elemene	9.98	1391	0.01	8.56*	1550	6.84
Vanillin	10.04	1396	0.01			
Isocaryophyllene	10.13	1402	0.03	8.29	1529	0.03
Methyleugenol	10.19	1406	0.07	13.33	1954	0.05
β-Caryophyllene	10.32	1415	6.73	8.56*	1550	[6.84]
Caryophylla-4(12),8(13)-diene	10.42	1423	0.02	8.74	1564	0.02
α-Humulene	10.75	1448	0.57	9.39	1615	0.52
allo-Aromadendrene	10.84	1454	0.01	9.11	1592	0.02
trans-Cadina-1(6),4-diene	11.04	1470	0.03	9.36	1612	0.03
γ-Murolene	11.09	1473	0.02	9.69*	1639	0.02
Germacrene D	11.13	1476	0.01	9.92	1658	0.01
β-Selinene	11.19	1480	0.01	9.97	1661	0.01
δ-Selinene	11.26	1485	0.01	9.69*	1639	[0.02]
α-Murolene	11.31	1490	0.02	10.14	1676	0.01
γ-Cadinene	11.57	1509	0.03	10.49	1704	0.02
trans-Calamenene	11.70	1519	0.08	11.32	1774	0.08
δ-Cadinene	11.71	1520	0.16	10.52	1707	0.15
Eugenyl acetate	11.85	1531	10.13	15.74	2187	10.20
Unknown [m/z 164, 135 (98), 93 (86), 107 (83), 79 (69)...]	12.02	1545	0.03	12.08	1841	0.02
Unknown [m/z 180, 93 (70), 55 (62), 77 (55), 164 (55), 103 (50)]	12.13	1553	0.04			
Caryophyllenyl alcohol	12.27	1564	0.04	13.68	1986	0.03

Caryophyllene oxide	12.41*	1575	0.44	12.84	1909	0.37
Caryophyllene oxide isomer	12.41*	1575	[0.44]	12.76	1902	0.04
Unknown [m/z 161, 187 (32), 105 (30), 205 (24)... 222 (3)]	12.41*	1575	[0.44]	15.09	2122	0.01
Unknown [m/z 151, 178 (54), 123 (20), 55 (13), 161 (11), 77 (10)...]	12.45	1578	0.02			
Humulene epoxide I	12.61	1591	0.01	13.20	1942	0.01
Humulene epoxide II	12.74	1601	0.04	13.44*	1964	0.05
(E)-Isoeugenyl acetate	12.85	1610	0.02			
1,10-diepi-Cubenol	12.89	1614	0.01	13.44*	1964	[0.05]
Caryophylladienol I	13.01	1623	0.04	16.07	2222	0.05
Caryophylladienol II	13.05	1626	0.03			
Cubenol	13.09	1630	0.05	13.76	1993	0.01
τ-Muurolol	13.18	1638	0.03	15.18	2132	0.04
14-Hydroxy-9-epi-(E)-caryophyllene	13.37	1653	0.07	16.47	2264	0.05
14-Hydroxy-(E)-caryophyllene	13.55	1668	0.07	16.83	2302	0.06
(E)-Coniferyl alcohol	14.33	1734	0.04			
(E)-4-(3-Hydroxy-1-propenyl)-2-methoxyphenyl acetate	16.93	1970	0.03			
Total identified		99.48%			99.47%	
Total reported		99.57%			99.50%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied
R.T.: Retention time (minutes)
R.I.: Retention index