

Analysis Garlic Essential Oil

Laboratoire
PhytoChemia





CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION 

Internal code : 18I25-FSE4-1-CC

Customer identification : Garlic - Austria - FX210818

Type : CO2 extract

Source : *Allium sativum*

Customer : Flowers Shining Everywhere Inc.



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 : Sylvain Mercier, M. Sc., Chimiste

Analysis date : September 28, 2018



Checked and approved by :



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

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PHYSICOCHEMICAL DATA

Physical aspect: Yellow viscous liquid
Refractive index: 1.4723 ± 0.0003 (20 °C)

CONCLUSION

The sample contains around 73% total fatty acids by mass, which is in line with the fact that this sample is sold as a garlic extract diluted in olive oil. Otherwise, the observed composition is in line with expectations for garlic. No adulterant, contaminant or other diluent has been detected using this method.



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ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Propene	0.32	0.43	Alkene
Allyl alcohol	0.20	0.15	Aliphatic alcohol
1,5-Hexadiene	0.26	0.30	Alkene
Methylthiirane?	0.40	0.24	Aliphatic sulfide
Allyl methyl sulfide	0.33	0.27	Aliphatic sulfide
Acetoin	0.03	0.28*	Aliphatic alcohol
Hexanal	0.09	0.09	Aliphatic aldehyde
Unknown	0.24		Aliphatic sulfide
Diallyl sulfide	1.78	1.43	Aliphatic sulfide
Allyl methyl disulfide	0.41	[0.28]*	Aliphatic sulfide
(Z)-1-Propenyl methyl disulfide	0.09		Aliphatic sulfide
(E)-1-Propenyl methyl disulfide	0.16		Aliphatic sulfide
1,2-Dithiolo	0.09	0.11	Aliphatic sulfide
Dimethyl trisulfide	0.11		Aliphatic sulfide
1,8-Cineole	0.13*	0.07	Monoterpenic ether
para-Cymene	[0.13]*	0.04	Monoterpene
Diallyl disulfide	5.03	4.17	Aliphatic sulfide
Allyl propyl disulfide	0.91	0.67	Aliphatic sulfide
Allyl (1E)-propenyl disulfide	2.04		Aliphatic sulfide
Allyl methyl trisulfide	1.67	0.96	Aliphatic sulfide
4-Methyl-1,2,3-trithiolane	0.09	0.07	Aliphatic sulfide
[4H]-1,2,3-trithiine	0.25*	0.21	Aliphatic sulfide
3-Vinyl-1,2-dithi-4-ene	[0.25]*		Aliphatic sulfide
2-Vinyl-[4H]-1,3-dithiine	0.78	0.66	Aliphatic sulfide
Diallyl trisulfide	10.98	8.88	Aliphatic sulfide
Allyl (1Z)-propenyl trisulfide	0.56		Aliphatic sulfide
Allyl (1E)-propenyl trisulfide	0.53		Aliphatic sulfide
Unknown	0.13		Aliphatic sulfide
Unknown	0.13		Unknown
Diallyl tetrasulfide	0.65	0.73	Aliphatic sulfide
Unknown	0.13	0.07	Aliphatic sulfide
Unknown	0.14		Aliphatic sulfide
Unknown	0.18		Aliphatic sulfide
Unknown	0.12		Aliphatic sulfide
Cyclic octaatomic sulfur	0.08		Sulfur
Squalene	16.25	19.48	Triterpene
Total identified	44.22%	39.25%	

*: Two or more compounds are coeluting on this column

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

Note: no correction factor was applied

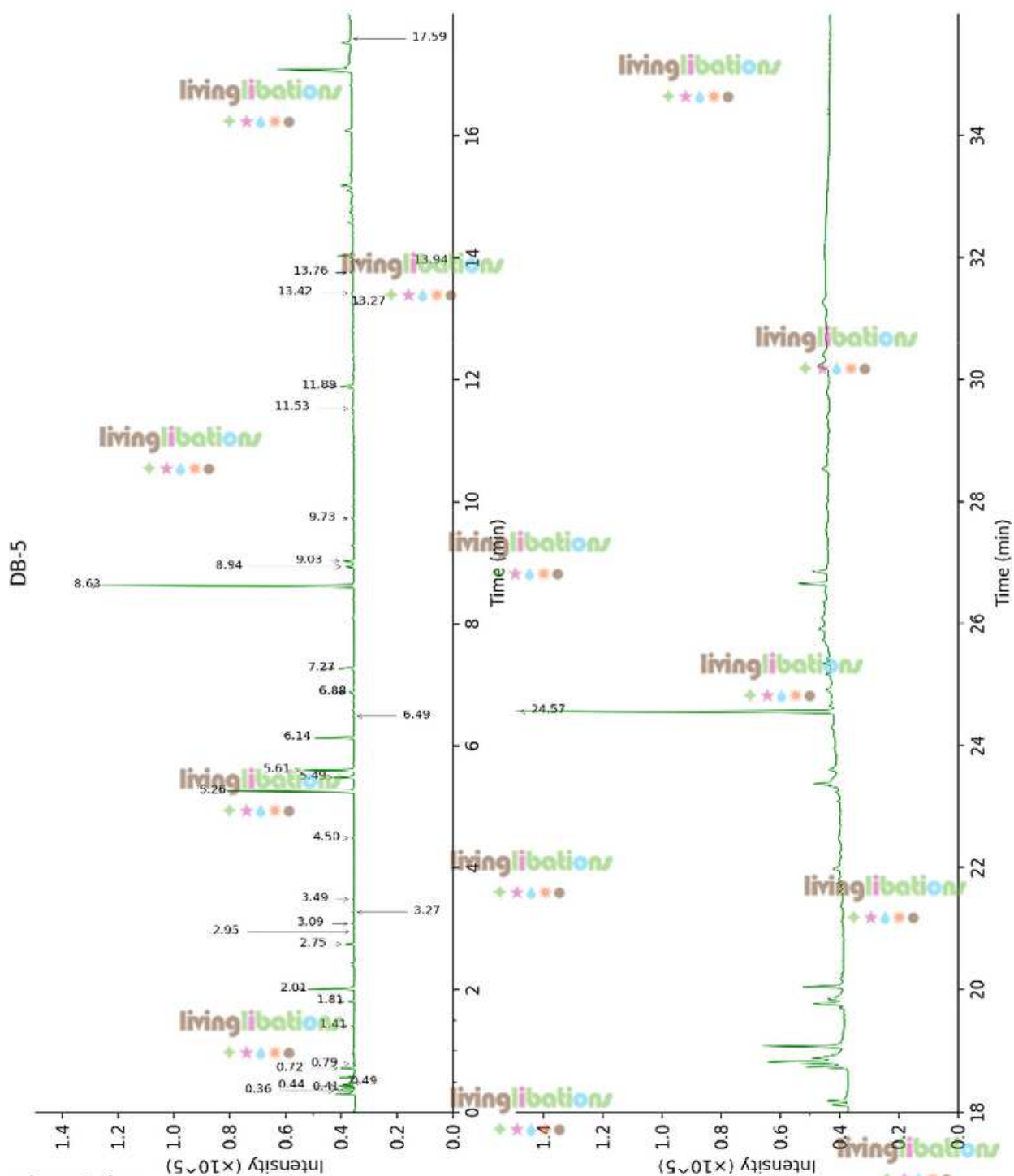
FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T.	R.I.	%	R.T.	R.I.	%
Propene	0.36	496	0.32	0.32	494	0.43
Allyl alcohol	0.41	532	0.20	2.17	1073	0.15
1,5-Hexadiene	0.44	560	0.26	0.38	661	0.30
Methylthiirane?	0.49	606	0.40	0.68	854	0.24
Allyl methyl sulfide	0.72	688	0.33	0.92	918	0.27
Acetoin	0.79	705	0.03	4.17*	1230	0.28
Hexanal	1.41	796	0.09	1.88	1044	0.09
Unknown [m/z 41, 106 (98), 64 (62), 45 (20)]	1.81	832	0.24			
Diallyl sulfide	2.01	849	1.78	2.53	1106	1.43
Allyl methyl disulfide	2.75	908	0.41	4.17*	1230	[0.28]
(Z)-1-Propenyl methyl disulfide	2.95	922	0.09			
(E)-1-Propenyl methyl disulfide	3.09	931	0.16			
1,2-Dithiole	3.27	944	0.09	7.23	1452	0.11
Dimethyl trisulfide	3.49	958				
1,8-Cineole	4.50*	1023	0.13	3.35	1169	0.07
para-Cymene	4.50*	1023	[0.13]	4.15	1229	0.04
Diallyl disulfide	5.26	1071	5.03	6.89	1427	4.17
Allyl propyl disulfide	5.49	1086	0.91	6.68	1411	0.67
Allyl (1E)-propenyl disulfide	5.61	1093	2.04			
Allyl methyl trisulfide	6.14	1127	1.67	8.20	1525	0.96
4-Methyl-1,2,3-trithiolane	6.49*	1150	0.09	9.98	1667	0.07
[4H]-1,2,3-trithiine	6.88*	1174	0.25	9.88	1659	0.21
3-Vinyl-1,2-dithi-4-ene	6.88*	1174	[0.25]			
2-Vinyl-[4H]-1,3-dithiine	7.27	1200	0.78	11.12	1764	0.66
Diallyl trisulfide	8.63	1290	10.98	10.65	1723	8.88
Allyl (1Z)-propenyl trisulfide	8.94	1311	0.56			
Allyl (1E)-propenyl trisulfide	9.03	1318	0.53			
Unknown [m/z 41, 120 (84), 73]	9.73	1367	0.13			

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73), 79 (56), 45 51), 158 (42)... 210? (3)]						
Unknown [m/z 145, 99 (75), 79 34), 111 (33), 55 (27)... 186 13)]	livinglibations 11.53	1499	0.13	livinglibations 10.55	1715	0.73
Diallyl sulfide	11.89	1527	0.65			
Unknown [m/z 73, 121 (63), 147 (34), 79 28), 41 (27)... 126 (1)]	13.27	1637	0.13	15.95	2219	0.07
Unknown [m/z 121, 73 (48), 89 33), 41 (26), 79 15), 75 (14)...]	13.42	1650	0.14			
Unknown [m/z 169, 210 (76), 73 (76), 105 55), 41 (47), 45 43)...]	13.76	1677	0.18			
Unknown [m/z 138, 106 (72), 112 (53), 59 37), 73 (35), 101 (27)]	13.94	1692	0.12			
Cyclic octatomic sulfur	17.59	2024	0.08			
Squalene	24.57	2822	16.25	22.97	3060	19.48
Total identified		44.22%			39.25%	
Total reported		45.30%			39.31%	

†: Two or more compounds are coeluting on this column

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

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

CO2 extract, *Allium sativum*
Internal code: 18I25-FSE4-1-CC

Garlic - Austria - FX210818

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