

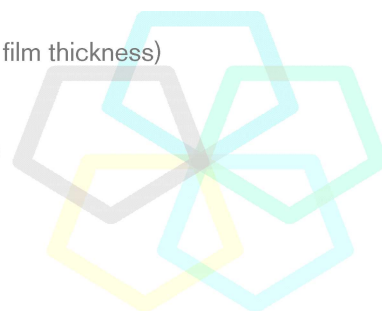


Aromatic Plant Research Center

We provide uncompromising
quality control for your products.

Customer : doTERRA International
Lot Number : 210715
Date Filled : 03/12/2021

Column : ZB5 (60 m length × 0.25 mm inner diameter × 0.25 µm film thickness)
Instrument : Shimadzu GCMS-QP2010 Ultra
Carrier gas : Helium 80 psi
Temperature ramp : 2 degrees celsius per minute up to 260-degrees celsius
Split ratio : 30:1
Sample preparation : 5%w/v solution with Dichloromethane.



Comments:

The analysis of this Black Pepper lot revealed no contaminants or adulteration.
The sample meets the expected chemical profile for authentic essential oils of Piper nigrum.

Analysied by : Ambika Poudel
Reviewed by : Dr. Prabodh Satyal



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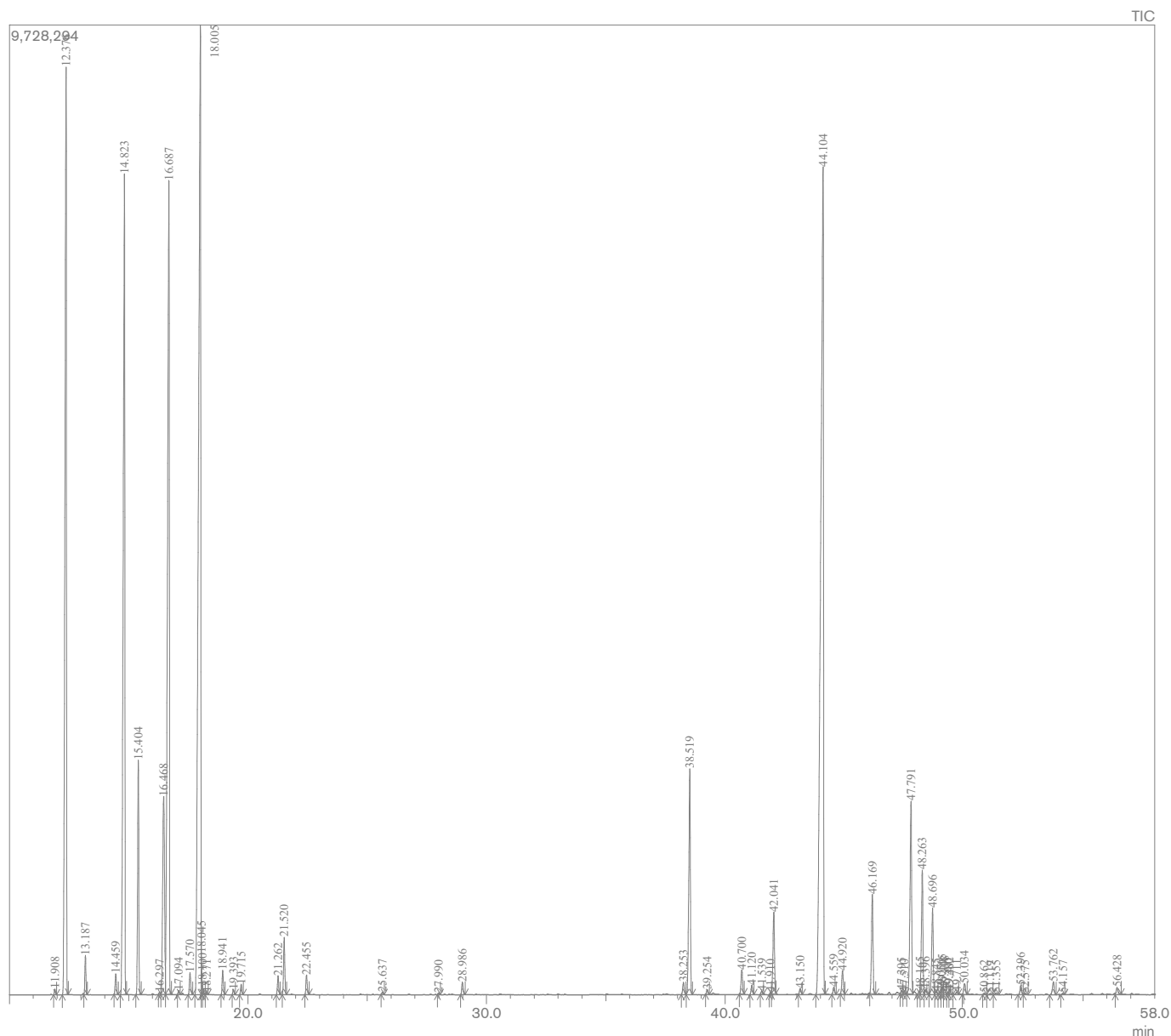
Black Pepper Essential Oil

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Chromatogram



Peak Report

Peak#	R.Time	Name	Area%
1	11.908	alpha-Thujene	0.05
2	12.376	alpha-Pinene	12.61
3	13.187	Camphene	0.36
4	14.459	Sabinene	0.23
5	14.823	beta-Pinene	11.73
6	15.404	Myrcene	2.37
7	16.297	para-Mentha-1 (7),8-diene	0.02
8	16.468	alpha-Phellandrene	3.28
9	16.687	delta-3-Carene	13.15
10	17.094	alpha-Terpinene	0.04
11	17.570	para-Cymene	0.26
12	18.005	Limonene	19.66
13	18.045	beta-Phellandrene	0.22
14	18.100	1,8-Cineole	0.04
15	18.271	cis-beta-Ocimene	0.02
16	18.941	trans-beta-Ocimene	0.26
17	19.393	Thujene isomer	0.05
18	19.715	gamma-Terpinene	0.11
19	21.262	para-Mentha-2,4(8)-diene	0.21
20	21.520	Terpinolene	0.63
21	22.455	Linalool	0.22
22	25.637	Camphor	0.03
23	27.990	Terpinen-4-ol	0.02
24	28.986	alpha-Terpineol	0.15
25	38.253	Bicycloelemene	0.16
26	38.519	delta-Elementene	3.14
27	39.254	alpha-Cubebene	0.06
28	40.700	alpha-Ylangene	0.32
29	41.120	alpha-Copaene	0.13
30	41.539	cis-beta-Elementene	0.04
31	41.910	beta-Cubebene	0.02
32	42.041	trans-beta-Elementene	1.12
33	43.150	alpha-Gurjunene	0.08
34	44.104	beta-Caryophyllene	20.53
35	44.559	gamma-Elementene	0.10
36	44.920	alpha-Guaiene	0.31
37	46.169	alpha-Humulene	1.33
38	47.395	trans-Cadina-1(6),4-diene	0.04
39	47.510	gamma-Gurjunene	0.03
40	47.791	Germacrene D	2.80
41	48.165	delta-Selinene	0.04
42	48.263	beta-Selinene	1.67
43	48.396	Viridiflorene	0.08
44	48.696	alpha-Selinene	1.19
45	48.845	alpha-Murolene	0.05
46	49.050	alpha-Bulnesene	0.03
47	49.105	beta-Cadinene	0.10
48	49.198	trans-trans-alpha-Farnesene	0.07
49	49.380	Germacrene A	0.03
50	49.402	beta-Bisabolene	0.05
51	49.711	gamma-Cadinene	0.04
52	50.034	delta-Cadinene	0.17
53	50.862	trans-Cadina-1,4-diene	0.02
54	51.119	alpha-Cadinene	0.02
55	51.355	alpha-Calcorene	0.03
56	52.396	Germacrene B	0.13
57	52.575	beta-Calcorene	0.02
58	53.762	Caryophyllene oxide	0.20
59	54.157	Spathulenol	0.02
60	56.428	iso-Spathulenol	0.10
			100.00

