

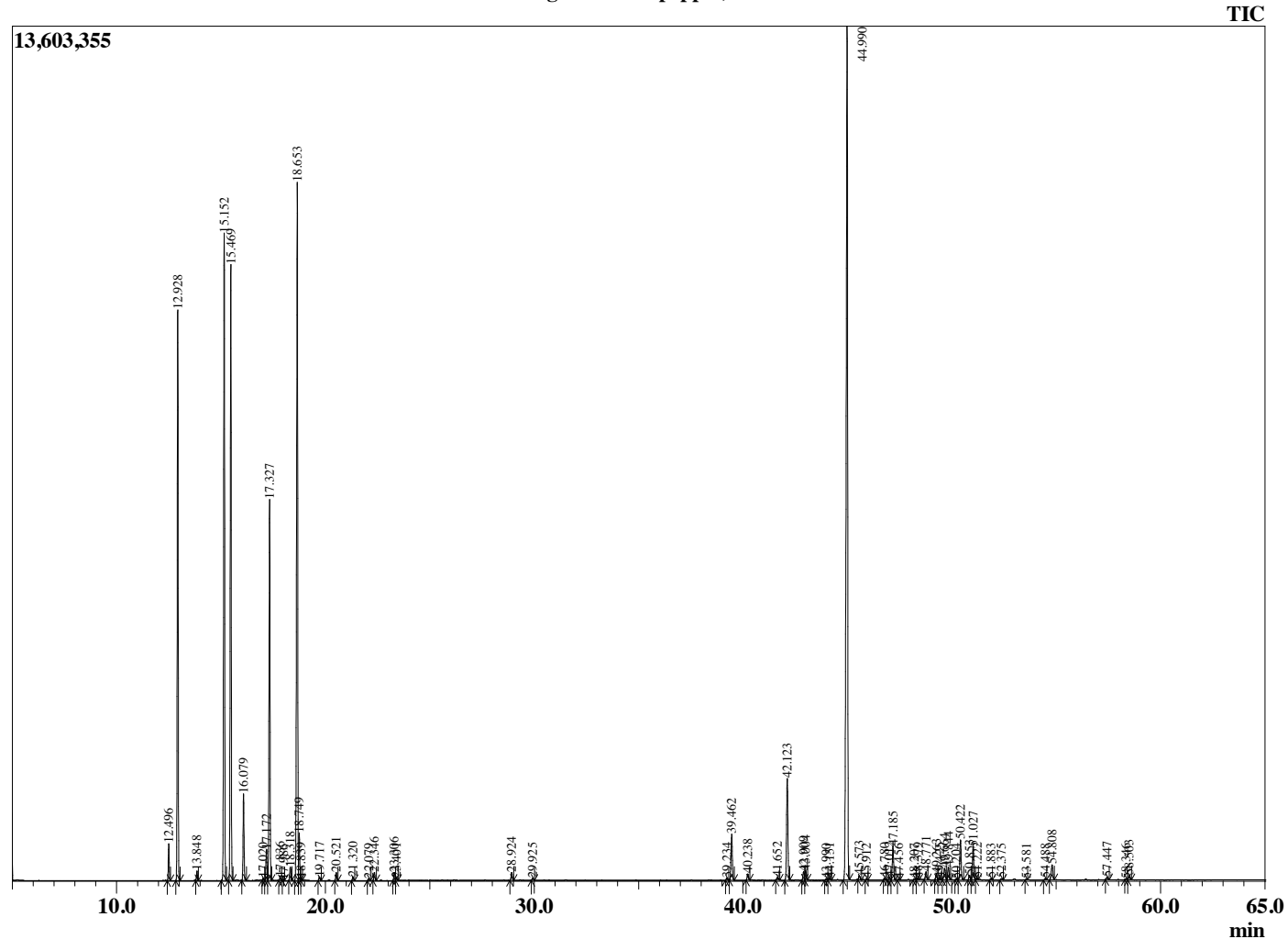
Sample Information

Analyzed by : Dr. Robert S. Pappas
 Analyzed : 11/11/2018 9:29:35 PM
 Sample Type : Essential Oil
 Sample Name : Black Pepper, Sri Lanka
 Sample ID : A1219B
 Injection Volume : 0.10
 Instrument ID: : GC-4



This report is valid for 1 year from the analyzed date.

Chromatogram Black pepper, Sri Lanka



R.Time	Name	Area%
12.496	alpha-Thujene	0.65
12.928	alpha-Pinene	10.52
13.848	Camphene	0.18
15.152	Sabinene	13.09
15.469	beta-Pinene	12.14
16.079	Myrcene	1.71
17.020	Pseudolimonene	0.04
17.172	alpha-Phellandrene	0.63
17.327	delta-3-Carene	7.73
17.836	alpha-Terpinene	0.07
17.986	ortho-Cymene	0.01
18.318	para-Cymene	0.29
18.653	Limonene	15.67
18.749	beta-Phellandrene	0.89
18.839	1,8-Cineole	0.04
19.717	trans-beta-Ocimene	0.08
20.521	gamma-Terpinene	0.17
21.320	trans-Sabinene hydrate	0.09
22.079	Terpinolene isomer	0.05
22.346	Terpinolene	0.18
23.306	Linalool	0.18
23.401	cis-Sabinene hydrate	0.05
28.924	Terpinen-4-ol	0.20
29.925	alpha-Terpineol	0.05
39.234	Elemene isomer	0.06
39.462	delta-Elemene	1.20
40.238	alpha-Cubebene	0.16
41.652	Isoledene	0.08
42.123	alpha-Copaene	2.75
42.909	beta-Cubebene	0.23
43.004	beta-Elemene	0.25
43.990	cis-beta-Caryophyllene	0.03
44.151	alpha-Gurjunene	0.06
44.990	beta-Caryophyllene	25.09
45.573	beta-Copaene	0.10
45.912	alpha-Guaiene	0.04
46.780	cis-Murrola-3,5-diene	0.04
47.012	trans-beta-Farnesene	0.08
47.185	alpha-Humulene	0.90
47.456	Alloaromadendrene	0.02
48.207	10-beta-H-Cadina-1(6),4-diene	0.03
48.379	trans-Cadina-1(6),4-diene	0.04
48.771	Germacrene D	0.20
49.263	beta-Selinene	0.15
49.425	trans-Muurolo-4(14),5-diene	0.06
49.664	Bicyclogermacrene	0.37
49.844	alpha-Muuroloene	0.35
50.204	(E,E)-alpha-Farnesene	0.02
50.422	beta-Bisabolene	1.10
50.853	gamma-Cadinene	0.12
51.027	delta-Cadinene	0.89
51.222	cis-Calamenene	0.04
51.883	trans-Cadine-1,4-diene	0.04
52.375	cis-alpha-Bisabolene	0.04
53.581	trans-Nerolidol	0.02
54.488	Spathulenol	0.03
54.808	Caryophyllene oxide	0.47
57.447	Unidentified	0.07
58.346	epi-alpha-Cadinol	0.02
58.503	delta-Cadinol	0.13
		100.00

Comments:

The analysis of this Black Pepper, Sri Lanka batch sample meets the expected chemical profile for authentic essential oil of *Piper nigrum*. No contamination or adulteration was detected.