

Sample Information

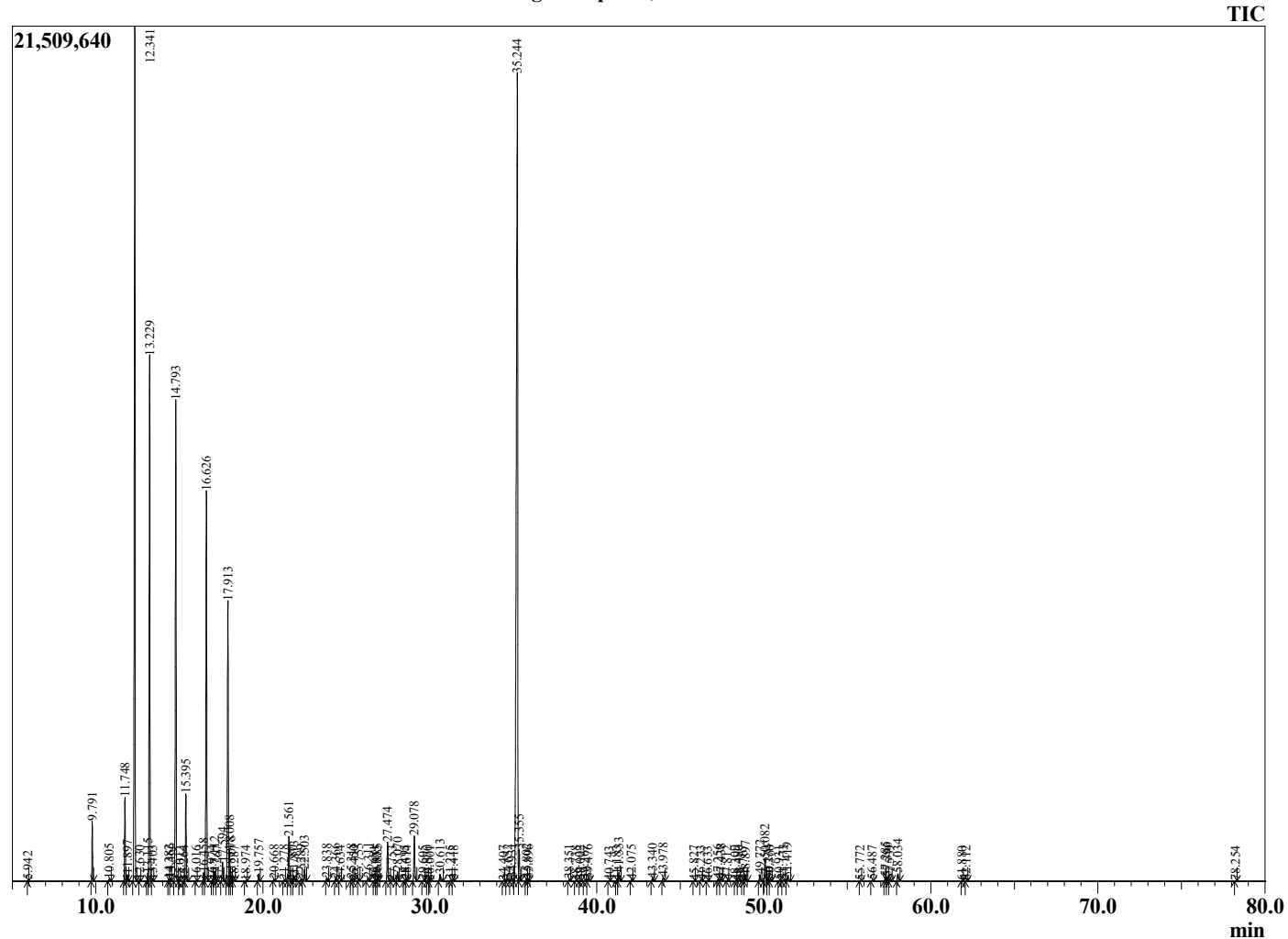
Analyzed by : Dr. Robert S. Pappas
 Analyzed : 12/1/2021 4:33:50 PM
 Sample Type : Essential Oil
 Sample Name : Spruce, Black Oil - Barefut
 Sample ID : 0108
 Injection Volume : 0.10
 Instrument ID : GC-4



Peak Report TIC

R.Time	Name	Area%
5.942	Toluene	0.01
9.791	Santene	1.00
10.805	Unidentified	0.06
11.748	Tricyclene	1.56
11.897	alpha-Thujene	0.12
12.341	alpha-Pinene	18.96
12.630	Unidentified	0.02
13.115	alpha-Fenchene	0.15
13.229	Camphene	10.87
13.403	Thuja-2,4(10)-diene	0.02
14.382	Cymene analogue	0.03
14.466	Sabinene	0.06
14.793	beta-Pinene	10.39
15.012	para-Mentha-2,8-diene	0.01
15.264	para-Menth-3-ene	0.01
15.395	Myrcene	1.77
16.016	delta-2-Carene	0.02
16.458	alpha-Phellandrene	0.19
16.626	delta-3-Carene	8.82
16.974	1,4-Cineole	0.02
17.112	alpha-Terpinene	0.21
17.267	ortho-Cymene	0.01
17.594	para-Cymene	0.44
17.913	Limonene	6.63
18.008	beta-Phellandrene	0.64
18.078	1,8-Cineole	0.19
18.287	cis-beta-Ocimene	0.02
18.974	trans-beta-Ocimene	0.02
19.757	gamma-Terpinene	0.16
20.668	Pinol	0.03
21.278	Isoterpinolene	0.04
21.561	Terpinolene	1.04
21.780	Fenchone	0.02
21.873	para-Cymenene	0.13
22.289	Campholenal isomer	0.05
22.503	Linalool	0.27
23.838	Fenchyl alcohol	0.08
24.366	alpha-Campholenal	0.06
24.634	Unidentified	0.02
25.318	trans-Pinocarveol	0.07
25.450	Unidentified	0.01
25.755	Camphor	0.05
26.311	Camphene hydrate	0.09
26.681	trans-Pinocamphone	0.02
26.835	Unidentified	0.02
26.885	Isoborneol	0.07
27.474	Borneol	0.99
27.753	cis-Pinocamphone	0.02
28.070	Terpinen-4-ol	0.24
28.495	para-Cymen-8-ol	0.02
28.614	Unidentified	0.03
29.078	alpha-Terpineol	1.19
29.605	Unidentified	0.02
29.870	Verbenone	0.01
30.001	Unidentified	0.02
30.613	Fenchyl acetate	0.20
31.225	Citronellol	0.02
31.418	Thymol methyl ether	0.03
34.407	Unidentified	0.01
34.652	cis-Verbenyl acetate	0.07
34.931	Unidentified	0.09
35.244	Bornyl acetate	29.12

Chromatogram Spruce, Black Oil - Barefut



Comments:

The analysis of this Black Spruce batch sample meets the expected chemical profile for authentic essential oil of *Picea mariana*. No contamination or adulteration was detected. The results provided in this GCMS quality analysis reflect the chemical composition of the oil and lot referenced above on the date of analysis.

R.Time	Name	Area%
35.355	Isobornyl acetate	0.71
35.802	Unidentified	0.07
35.896	trans-Pinocarvyl acetate	0.05
38.351	Unidentified	0.04
38.738	Unidentified	0.01
39.002	Unidentified	0.02
39.267	alpha-Terpinyl acetate	0.03
39.476	Citronellyl acetate	0.05
40.743	Unidentified	0.01
41.183	alpha-Copaene	0.01
41.333	Geranyl acetate	0.23
42.075	beta-Elemene	0.03
43.340	Longifolene	0.08
43.978	trans-beta-Caryophyllene	0.10
45.827	Cadina-3,5-diene	0.01
46.233	alpha-Humulene	0.03
46.633	cis-Muurolo-4(14),5-diene	0.01
47.256	trans-Cadina-1(6),4-diene	0.05
47.438	gamma-Muuroloene	0.07
47.812	Germacrene D	0.02
48.309	beta-Selinene	0.01
48.480	gamma-Amorphene	0.02
48.767	Amorpha-4,7(11)-diene	0.04
48.897	alpha-Muuroloene	0.15
49.772	gamma-Cadinene	0.18
50.082	delta-Cadinene	0.62
50.274	cis-Calamenene	0.06
50.360	Zonarene	0.04
50.931	trans-Cadina-1,4-diene	0.02
51.173	alpha-Cadinene	0.04
51.419	trans-alpha-Bisabolene	0.10
55.772	1,10-di-epi-Cubenol	0.01
56.487	Epicubenol	0.02
57.285	epi-alpha-Cadinol	0.12
57.396	epi-alpha-Muurolol	0.12
57.539	alpha-Muurolol	0.04
58.034	alpha-Cadinol	0.20
61.880	Unidentified	0.01
62.112	Unidentified	0.01
78.254	Manool	0.01
		100.00