



Aromatic Plant Research Center

We provide uncompromising
quality control for your products.

Customer : doTERRA International
Lot Number : 232142
Date Filled : 08/02/2023

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 Spruce lot revealed no contaminants or adulteration.
The sample meets the expected chemical profile for authentic essential oils of *Picea mariana*.

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



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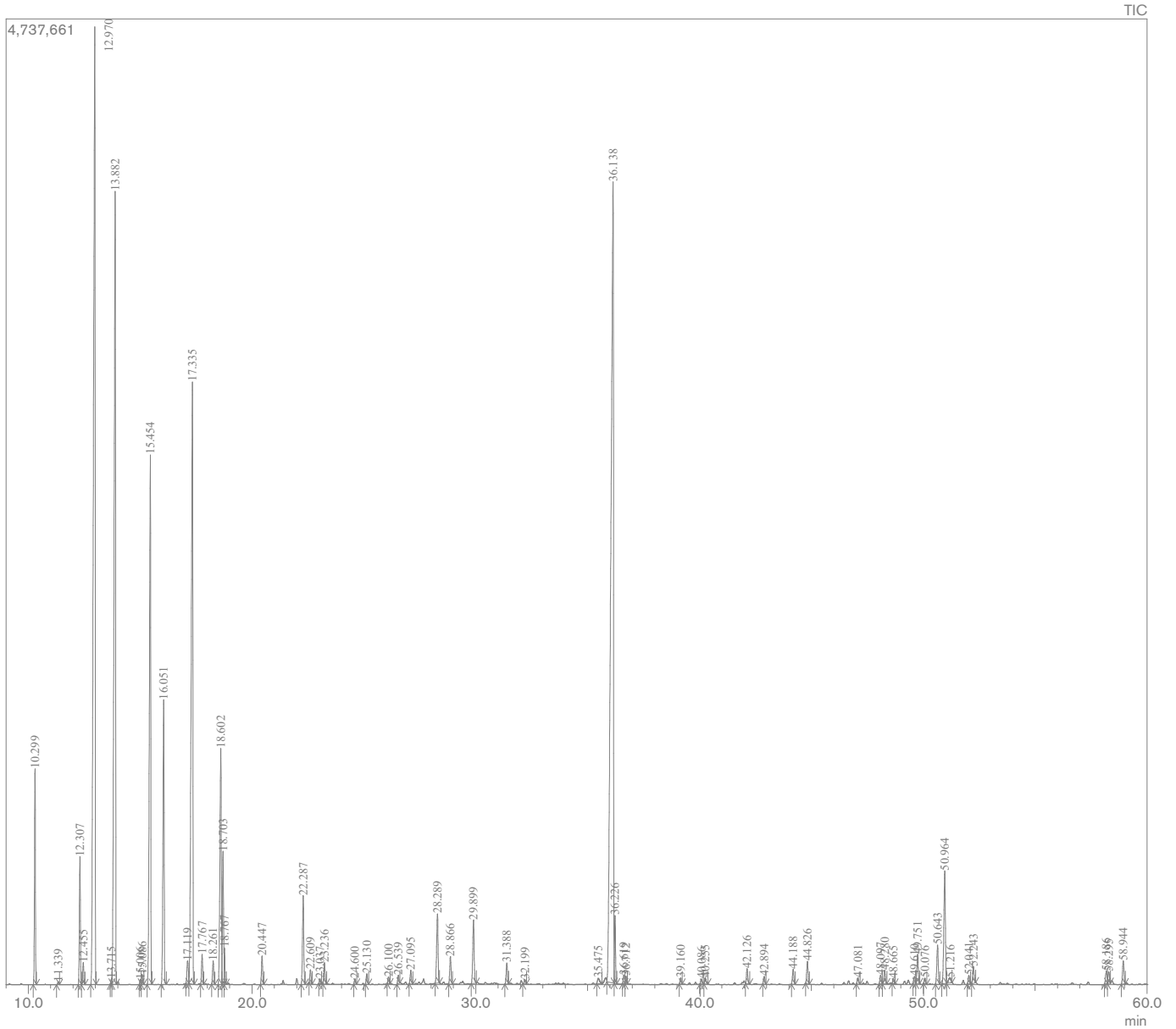
Black Spruce Essential Oil

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Chromatogram



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Peak Report

Peak#	R.Time	Name	Area%
1	10.299	Santene	2.10
2	11.339	Santolina triene	0.03
3	12.307	Tricyclene	1.43
4	12.455	alpha-Thujene	0.26
5	12.970	alpha-Pinene	18.14
6	13.715	alpha-Fenchene	0.05
7	13.882	Camphene	13.34
8	15.006	3,7,7-Trimethyl-1,3,5-cycloheptatriene	0.05
9	15.086	Sabinene	0.12
10	15.454	beta-Pinene	7.76
11	16.051	Myrcene	3.70
12	17.119	alpha-Phellandrene	0.36
13	17.335	delta-3-Carene	10.67
14	17.767	alpha-Terpinene	0.36
15	18.261	para-Cymene	0.30
16	18.602	Limonene	3.64
17	18.703	beta-Phellandrene	1.59
18	18.767	1,8-Cineole	0.32
19	20.447	gamma-Terpinene	0.36
20	22.287	Terpinolene	1.19
21	22.609	para-Cymenene	0.17
22	23.037	6-Camphenone	0.06
23	23.236	Linalool	0.29
24	24.600	endo-Fenchol	0.07
25	25.130	alpha-Campholenal	0.14
26	26.100	trans-Pinocarveol	0.09
27	26.539	Camphor	0.11
28	27.095	Camphene hydrate	0.19
29	28.289	Borneol	1.07
30	28.866	Terpinen-4-ol	0.40
31	29.899	alpha-Terpineol	0.98
32	31.388	endo-Fenchyl acetate	0.30
33	32.199	Thymol methyl ether	0.06
34	35.475	cis-Chrysanthenyl acetate	0.12
35	36.138	Bornyl acetate	23.07
36	36.226	Isobornyl acetate	0.76
37	36.619	Dehydro bornyl acetate	0.12
38	36.712	trans-Pinocarvyl acetate	0.10
39	39.160	cis-Pipertiol acetate	0.09
40	40.086	alpha-Terpinyl acetate	0.07
41	40.255	Citronellyl acetate	0.10
42	42.126	Geranyl acetate	0.23
43	42.894	beta-Elemene	0.11
44	44.188	Longifolene	0.23
45	44.826	beta-Caryophyllene	0.34
46	47.081	alpha-Humulene	0.10
47	48.097	cis-Cadina-1(6),4-diene	0.14
48	48.280	trans-Cadina-1(6),4-diene	0.21
49	48.665	Germacrene D	0.08
50	49.610	cis-beta-Guaiene	0.10
51	49.751	alpha-Murolene	0.45
52	50.076	trans-trans-alpha-Farnesene	0.07
53	50.643	delta-Amorphene	0.61
54	50.964	delta-Cadinene	1.91
55	51.216	Zonarene	0.13
56	52.041	alpha-Cadinene	0.12
57	52.243	Bisabolene-isomer	0.27
58	58.186	alpha-Murolol	0.22
59	58.295	epi-alpha-Murolol	0.18
60	58.944	alpha-Cadinol	0.37
			100.00

