

Certificate of Analysis

Product: Mānuka Oil [MβTK 20+]
 (*Leptospermum scoparium* branch/leaf oil)
Product Code: 20MB
Batch No.: M121021P20



Origin & Physical Properties

Country of Origin	New Zealand
Harvest Region	North Island New Zealand
Plant Part Used	Aerial Leaf & twig
Extraction Method	Steam Distillation
Viscosity ¹	Mobile Semi Viscous Liquid
Colour ²	Clear
Odour	Characteristic & woody
Flash Point	> 94 °C
Refractive Index @ 20°C	1.502
Relative Density @ 20°C	0.943
Optical Rotation @ 20°C	-29.41°
Moisture Content (Visual)	No visible water @ 20°C
INCI Name	<i>Leptospermum scoparium</i> branch/leaf oil
CAS No.	[223749-44-8]
MβTK™ (Total Manuka β-Triketone Content)	22.41
Best Before ³	October 2027

¹Viscosity is temperature dependent.

²Faint seasonal green to yellow translucent variations can be observed.

³6 Years if unopened and stored under optimum storage conditions (in approved sealed containers, away from direct sunlight and in cool environment). Longer is subject to retesting.

Principle Organic Constituents For Manuka Oil [MβTK 20+]⁴

(% Area by GC-FID/MS, as tested by independent accredited lab SCPS⁵)

Chemical Compounds	Batch No. M121021P20 (%)	Specification ⁶ (%)
α-pinene	1.06	< 2
cis-calamenene	8.72	≥ 5.0 – 12.5
flavesone (<i>β-Triketone</i>)	5.27	≥ 3.9 – 5.5
isoleptospermone (<i>β-Triketone</i>)	4.12	≥ 3.0 - 5.5
leptospermone (<i>β-Triketone</i>)	12.58	≥ 11 - 16
grandiflorone (<i>β-Triketone</i>)	0.44	≥ 0 - 1.0
MβTK™ (<i>Total β-triketones</i>)	22.41	≥ 20

⁴Not less than 20% MβTK actives.

⁵Southern Cross Plant Science; Analytical Research Laboratory Australia.

⁶Specification standard by Mānuka Biologicals Ltd for Mānuka Oil [MβTK 20+].

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 Dr Wayne M. Campbell
 Science & Technical Manager
 Mānuka Biologicals Ltd

CERTIFICATE OF ANALYSIS

SAMPLE NAME	Manuka Oil Steam Distilled		
FORM	Oil		
CUSTOMER NAME	Manuka Biologicals Limited		
CERTIFICATION DATE	19 November 2021		
CUSTOMER REFERENCE	M121021P20		
ARL JOB #	A212850	LAB REF. #	ARL2107891
ANALYSIS	FULL CoA - Manuka		

TEST	RESULTS	TEST METHOD
Relative Density @ 20°C	0.943	Ph.Eur.2.2.5
Refractive Index @ 20°C	1.502	Ph.Eur.2.2.6
Optical Rotation @ 20°C	-29.75°	Ph.Eur.2.2.7
MβTK**	22.41	ARL-TM101-4*

TEST	RESULTS	TEST METHOD
	Area %	
α-pinene	1.1	ARL-TM101-4*
α-cubebene	4.1	
α-ylangene	0.2	
α-copaene	4.8	
β-elemene	1.2	
β-caryophyllene	2.9	
aromadendrene	1.7	
iso ledene	6.4	
α-humulene	0.6	
7αH, 10βH, cadina 1,4 diene	4.6	
cadina 3,5 diene	0.9	
germacrene D	1.4	
β-selinene	6.0	
α-selinene	5.7	
epi-bicyclosqui-phellandrene	1.2	
δ-cadinene	4.7	
(trans) cadina 1,4 diene	5.4	
(cis) calamenene	8.7	
flavesone	5.3	
spathulenol	0.5	
caryophyllene oxide	0.4	
iso leptospermone	4.1	
leptospermone	12.6	
cubenol	0.9	
intermedeol	0.3	
grandiflorone	0.4	

*Assay by GC(FID detection)**Total β-triketones is the sum of flavesone, iso leptospermone, leptospermone and grandiflorone.



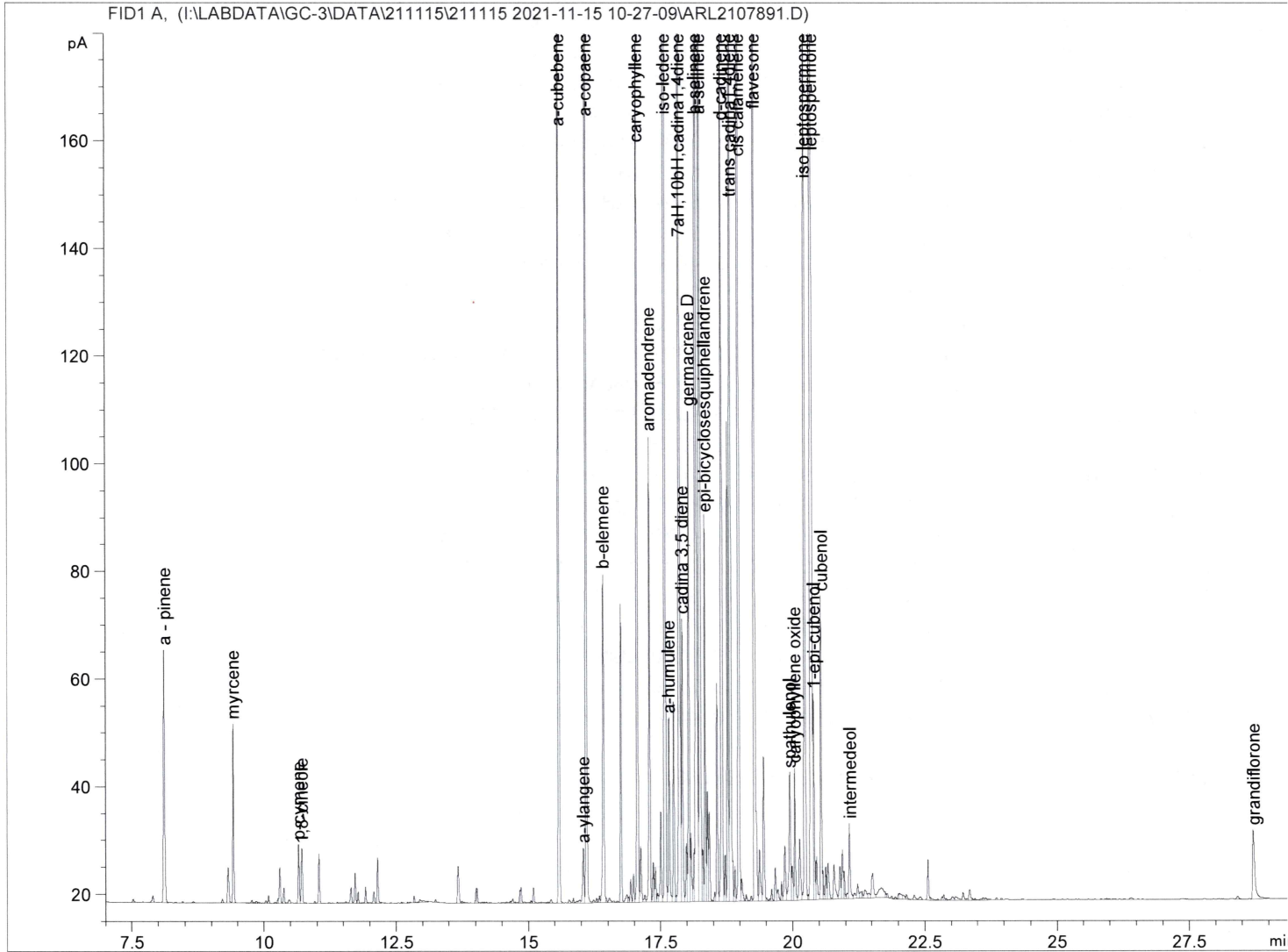
QC AUTHORISED

Sample Name: Manuka Oil Steam Distilled M121021P20

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Acq. Operator   : AW                      Seq. Line :    4
Acq. Instrument : GC-3                   Location  : Vial 3
Injection Date  : 15/11/2021 3:22:11 PM  Inj       :    1
                                           Inj Volume: 1.000 µl

Acq. Method     : C:\DATA_GC-3\DATA\211115\211115 2021-11-15 10-27-09\EO BASEMETHOD 2020.M
Last changed    : 14/10/2020 8:51:31 AM by RP
Analysis Method : W:\ARL\ANALYTICAL\USER\ESSENTIAL OILS\...ANALYSIS METHODS 2021\GC3 ANALYSIS
                 METHODS 2020\MANUKA.M
Last changed    : 17/11/2021 11:40:27 AM
Method Info     : Method to analyse essential oils
    
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Area Percent Report

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Sorted By      :      Signal
Calib. Data Modified : 17/11/2021 11:38:55 AM
Multiplier    :      1.0000
Dilution      :      1.0000
Use Multiplier & Dilution Factor with ISTDs
    
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Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area [pA*s]	Area %	Name
1	8.123	BV	0.0305	90.52359	1.0588	a - pinene
2	9.418	VB	0.0221	47.34862	0.5538	myrcene
3	10.657	VV	0.0224	15.48464	0.1811	p-cymene
4	10.716	VV	0.0273	17.33132	0.2027	1,8-cineole
5	15.584	VV	0.0236	348.31458	4.0740	a-cubebene
6	16.038	VV	0.0261	17.63524	0.2063	a-ylangene
7	16.100	VV	0.0234	408.21603	4.7746	a-copaene
8	16.422	VV	0.0254	101.51421	1.1873	b-elemene
9	17.069	VV	0.0230	246.52135	2.8834	caryophyllene
10	17.296	VV	0.0252	142.41521	1.6657	aromadendrene
11	17.591	VV	0.0217	546.95972	6.3974	iso-ledene
12	17.662	VV	0.0234	52.55495	0.6147	a-humulene
13	17.863	VV	0.0253	389.60220	4.5569	7aH,10bH,cadina1,4diene
14	17.913	VV	0.0233	77.82310	0.9102	cadina 3,5 diene
15	18.039	VV	0.0202	123.11179	1.4400	germacrene D
16	18.176	VV	0.0239	510.06448	5.9659	b-selinene
17	18.251	VV	0.0232	484.85681	5.6710	a-selinene
18	18.344	VV	0.0232	105.18215	1.2302	epi-bicyclosesquiphellandrene
19	18.661	VV	0.0212	403.16486	4.7155	d-cadinene
20	18.825	VV	0.0229	464.49258	5.4329	trans cadina1,4diene
21	18.990	VV	0.0213	745.81635	8.7233	cis calamenene
22	19.286	VV	0.0220	450.49075	5.2691	flavesone
23	19.950	VV	0.0288	46.23083	0.5407	spathulenol
24	20.043	VV	0.0233	37.43596	0.4379	caryophyllene oxide
25	20.235	VV	0.0226	352.06934	4.1179	iso leptospermone
26	20.374	VV	0.0240	1075.26013	12.5766	leptospermone
27	20.407	VV	0.0217	54.75599	0.6404	1-epi-cubenol
28	20.548	VV	0.0217	78.14115	0.9140	cubenol
29	21.081	VV	0.0241	23.51211	0.2750	intermedeol
30	28.725	VB	0.0406	37.99290	0.4444	grandiflorone

Totals : 7494.82296 87.6619

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*** End of Report ***