

### CERTIFICATE OF ANALYSIS

<b>SAMPLE NAME</b>		Lime oil Cold Pressed	
<b>FORM</b>		Oil	
<b>CUSTOMER NAME</b>		Buckley & Phillips Aromatics	
<b>CERTIFICATION DATE</b>		06 May 2019	
<b>CUSTOMER REFERENCE</b>		29916/16	
<b>ARL JOB #</b>	A190904	<b>LAB REF. #</b>	ARL1902302
<b>ANALYSIS</b>	GCFID - Area%		

TEST	ISO 3809** SPECIFICATION		ISO 3519*** SPECIFICATION	ISO 23954**** SPECIFICATION	RESULTS	TEST METHOD
	Mexican type, Type A	Mexican type, Type B	Mexican type	Persian type		
	Area %					
α-pinene	2.0 - 3.0	1.7 - 2.0	0.8 - 1.3	2.0 - 2.5	1.96	ARL-TM101-3*
sabinene	1.8 - 4.0	2.0 - 3.0	0.1 - 0.3	-	1.89	
β-pinene	18.0 - 24.0	17.0 - 19.0	1.0 - 3.0	10.0 - 12.0	11.77	
myrcene	1.0 - 2.0	1.4 - 1.8	1.1 - 1.5	1.2 - 2.0	1.49	
p-cymene	tr - 0.5	tr - 0.5	1.5 - 2.8	0.0 - 0.5	1.96	
limonene	42.0 - 50.0	38.0 - 44.0	45.0 - 50.0	47.0 - 53.0	58.10	
g-terpinene	8.0 - 11.0	9.0 - 9.7	10.0 - 13.0	11.0 - 14.0	12.19	
terpinen-4-ol	0.2 - 0.6	0.2 - 0.6	-	-	nd	
fenchol	-	-	0.4 - 0.8	-	nd	
borneol	-	-	0.5 - 0.8	-	nd	
α-terpineol	0.2 - 0.6	0.3 - 0.6	6.0 - 8.0	-	0.22	
g-terpineol	-	-	0.7 - 1.4	-	nd	
n-decanal	0.05 - 0.3	0.15 - 0.35	-	-	nd	
neral	1.2 - 2.0	2.0 - 2.5	-	1.0 - 2.0	0.81	
geranial	2.0 - 3.0	3.0 - 3.7	-	2.0 - 3.0	1.23	
neryl acetate	0.1 - 0.35	0.0 - 0.25	-	0.6 - 1.3	0.85	
geranyl acetate	0.2 - 0.4	0.3 - 0.6	-	0.2 - 0.4	nd	
β-caryophyllene	0.5 - 1.5	1.5 - 1.9	0.4 - 0.8	0.4 - 0.6	0.39	
α-bergamotene	1.0 - 1.9	0.5 - 0.7	0.5 - 0.9	0.8 - 1.3	0.87	
α-farnesene	0.75 - 1.75	-	0.6 - 0.9	-	0.19	
β-bisabolene	1.0 - 1.5	4.0 - 4.5	1.0 - 1.5	1.5 - 2.0	1.44	

\* Assay by GC (FID detection –area percent report) nd- denotes not detected


\*\* Oil of lime (cold pressed), Mexican type [*Citrus aurantifolia* (Christm.) Swingle], obtained by mechanical means

\*\*\* Oil of lime (cold pressed), Mexican type [*Citrus aurantifolia* (Christm.) Swingle], obtained by distillation

\*\*\*\* Oil of lime expressed, Persian type (*Citrus latifolia* Tanaka)

nd - denotes not detected

  
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Dr Jeanette Balindong  
ANALYTICAL OFFICER

  
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Mr Ashley Dowell  
MANAGER - ARL



Sample Name: LIME OIL COLD PRESSED 29916/16

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 Area Percent Report  
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Sorted By : Signal  
 Calib. Data Modified : 2/13/2019 1:34:23 PM  
 Multiplier: : 1.0000  
 Dilution: : 1.0000  
 Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area [pA*s]	Area %	Name
1	7.919	VB	0.0261	20.42793	0.49674	a-thujene
2	8.134	VB	0.0274	80.47758	1.95694	a-pinene
3	9.219	VV	0.0247	77.73829	1.89033	sabinene
4	9.332	VV	0.0252	484.06384	11.77078	b-pinene
5	9.417	VV	0.0212	61.09553	1.48563	myrcene
6	10.323	BV	0.0272	2389.37573	58.10145	limonene
7	10.651	BV	0.0200	80.54855	1.95867	p-cymene
8	11.041	BB	0.0214	501.23761	12.18839	g-terpinene
9	11.640	BB	0.0196	19.03057	0.46276	terpinolene
10	13.946	VV	0.0208	8.84705	0.21513	a-terpineol
11	14.901	VB	0.0207	33.12790	0.80556	neral
12	15.390	VV	0.0207	50.38894	1.22529	geranial
13	16.404	VV	0.0216	35.09917	0.85349	neryl acetate
14	16.910	VB	0.0208	35.80769	0.87072	a-bergamotene
15	17.038	BV	0.0221	15.91843	0.38708	b-caryophyllene
16	18.011	BV	0.0201	7.70012	0.18724	a-farnesene
17	18.068	VV	0.0219	59.37374	1.44377	b-bisabolene

Totals : 3960.25869 96.3000

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 \*\*\* End of Report \*\*\*

02/05/19