

Table 1 COMPOSITIONAL CHANGES IN COMMERCIAL LEMON ESSENTIAL OIL UNDER STORAGE CONDITION S-1^a

Peak no.	RI ^b	RI ^c	Compound	Month									
				0	1	2	3	4	5	6	9	12	
1	1027	940	α -Pinene	1.8 ^d	2.0	1.7	1.6	1.6	1.5	1.0	0.6	0.6	
2	1079	955	Camphene ^e	0.1	**	**	**	**	**	**	**	**	
3	1130	983	β -Pinene	12.2	11.1	9.7	9.4	9.2	8.2	5.8	3.9	4.0	
4	1139	985	Sabinene	2.0	1.8	1.5	1.3	1.2	1.1	0.7	0.4	0.4	
5	1174	991	Myrcene	1.4	1.2	1.0	0.8	0.7	0.6	0.3	0.1	0.1	
6	1183	1006	α -Phellandrene	**	*	nd	nd	nd	nd	nd	nd	nd	
7	1200	1018	α -Terpinene	0.1	**	nd	nd	nd	nd	nd	nd	nd	
8	1230	1033	Limonene	68.5	61.9	53.5	52.6	51.6	49.0	32.8	24.0	20.1	
9	1235		β -Phellandrene	0.3	0.2	0.1	0.1	0.1	**	**	nd	nd	
10	1237	1033	1,8-Cineole	0.1	0.1	0.1	0.1	**	0.1	**	**	*	
11	1250	1084	(<i>Z</i>)- β -Ocimene	0.1	**	**	**	*	*	*	**	nd	
12	1270	1022	γ -Terpinene	7.2	4.0	1.6	0.4	0.1	*	*	**	**	
13	1294	1021	<i>p</i> -Cymene	1.6	4.0	5.4	6.7	7.0	7.1	5.1	4.3	4.8	
14	1306	1086	Terpinolene ^e	0.3	0.1	**	**	nd	nd	nd	nd	nd	
15	1308	1175	Octanal	0.2	0.2	0.1	0.1	0.1	0.1	**	**	**	
16	1357		6-Methyl-5-hepten-2-one	**	**	**	**	**	**	**	**	**	
17	1410	1092	Nonanal	0.1	0.1	0.1	**	**	**	**	**	**	
18	1429	1105	Undecane	*	**	**	**	**	**	**	**	**	
19	1440		Unidentified ^g	*	*	*	*	*	*	**	**	**	
20	1464		<i>cis</i> -Linalool oxide	nd	nd	*	*	*	*	**	**	**	
21	1470	1121	<i>cis</i> -Limonene oxide	**	0.2	0.2	0.3	0.5	0.7	0.7	0.6	0.7	
22	1482	1125	<i>trans</i> -Limonene oxide	0.1	0.3	0.4	0.5	0.6	0.8	0.6	0.7	0.8	
23	1483	1180	<i>cis</i> - β -Terpineol	**	*	**	nd	nd	**	**	**	**	
24	1490	1141	Octyl acetate ^e	**	0.1	0.1	0.1	0.1	0.1	**	**	**	
25	1497	1141	Citronellal ^e	**	**	**	**	**	*	*	**	**	
26	1502		Unidentified	*	nd	nd	*	*	*	*	**	**	
27	1516	1191	Decanal ^c	**	**	**	*	**	*	*	**	**	
28	1540	1135	Camphor	**	**	**	**	**	**	**	**	**	
29	1544		Unidentified	*	**	**	**	**	**	**	**	**	
30	1563	1092	Linalool	0.1	0.1	0.1	0.1	0.1	0.1	**	**	**	
31	1570		<i>trans</i> - β -Terpineol	*	nd	nd	**	**	**	**	**	**	
32	1587		<i>p</i> -Mentha-1,8-dien-9-ol	*	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	
33	1590		Unidentified	*	**	0.1	0.1	0.1	0.2	0.1	0.2	0.2	
34	1592		α -Farnesene ^f	**	*	**	**	**	*	**	**	*	
35	1597		α -Santalene	*	*	**	0.1	0.1	0.1	0.1	0.1	0.1	
36	1603		α -Bergamotene ^f	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	
37	1618	1429	β -Caryophyllene ^c	0.1	0.1	**	**	**	nd	nd	nd	nd	
38	1622	1175	Terpinen-4-ol	0.1	0.1	**	0.1	**	0.1	**	**	**	
39	1629		(<i>Z</i>)- β -Farnesene	**	*	**	**	**	**	**	**	**	
40	1646		<i>p</i> -Menth-8-one	*	*	**	0.1	0.1	0.2	0.2	0.3	0.6	
41	1665	1342	Citronellyl acetate	*	*	**	**	**	**	**	**	**	

Table 1 (CONTINUED)

Peak no.	RI ^b	RI ^c	Compound	Month									
				0	1	2	3	4	5	6	9	12	
42	1675		<i>trans</i> -pino-Carveol	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4	
43	1688		<i>trans</i> - <i>p</i> -2,8-Menthadien-1-ol	*	**	**	0.1	0.1	0.2	0.2	0.3	0.4	

											Sawamura M. et al.	
44	1697	1023	Neral	0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.2
45	1699		Unidentified	nd	**	**	**	0.1	0.1	0.1	0.1	0.3
46	1713	1184	α -Terpineol	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
47	1730		Unidentified	nd	nd	nd	nd	nd	**	**	**	**
48	1733	1352	Neryl acetate ^e	0.1	0.1	0.1	0.4	0.4	0.3	0.2	0.2	0.2
49	1736	1457	(<i>E</i>)- β -Farnesene	1.0	0.9	0.8	0.5	0.5	0.3	0.2	0.1	0.1
50	1744	1223	Geranial	0.9	0.7	0.5	0.4	0.3	0.2	0.1	0.1	**
51	1750	1222	Carvone	**	**	**	0.2	0.2	0.4	0.4	0.7	1.0
52	1758		2,6-Octadien-1-ol	nd	nd	nd	nd	nd	nd	nd	0.1	*
53	1767	1340	Geranyl acetate ^e	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
54	1775	1220	Citronellol	*	*	**	**	0.1	*	*	*	*
55	1783		Sesquiterpene	*	*	*	*	**	*	*	*	*
56	1803	1257	Perillyl aldehyde ^e	**	**	0.1	0.1	0.1	0.1	0.1	0.2	0.1
57	1812		Myrtenol	nd	nd	**	0.1	0.1	0.1	0.1	0.3	0.3
58	1814	1219	Nerol ^e	*	**	**	**	**	**	**	**	**
59	1827		Geranyl propionate	*	*	*	*	*	*	*	*	*
60	1848	1207	<i>cis</i> -Carveol	*	**	0.1	0.2	0.2	0.3	0.4	0.7	0.9
61	1855		<i>p</i> -Cymene-8-ol	nd	nd	nd	*	**	0.1	**	0.1	0.1
62	1859	1241	Geraniol	**	**	**	**	**	**	**	**	0.1
63	1879		<i>trans</i> -Carveol	*	**	0.1	0.1	0.2	0.2	0.2	0.3	0.4
64	1902		Tetradecane	nd	nd	nd	*	**	**	0.1	0.1	0.1
65	1962		Decanoic acid	nd	**	0.1	0.1	0.1	0.2	0.2	0.2	0.2
66	1999		<i>trans</i> -2- α -Bisabolene epoxide	*	**	**	**	**	0.1	0.1	0.1	0.1
67	2099		Unidentified	**	0.1	0.1	0.1	0.2	**	0.1	0.1	0.1
68	2133		Spathulenol	**	**	**	**	**	0.1	**	0.1	0.1
69	2179	1675	α -Bisabolol ^e	**	**	**	**	**	**	**	0.1	0.1
70	2222		Limonene epoxide	**	**	**	0.1	0.1	0.1	0.1	0.2	0.3
71	2278		1,2-Cyclohexanediol	0.2	0.2	0.4	0.5	0.6	0.5	0.6	1.0	1.3
Total amount (%)				99.1	92.0	80.5	79.6	79.0	75.4	52.9	42.8	41.3

^a: Stored in an incubator set at 25°C with involvement opening the cap for 3 min everyday.

^b: Retention index on DB-Wax.

^c: Retention index on DB-1.

^d: The relative proportion (w/w %) represents average of triplicate.

^e: Co-injection was additionally carried out.

^f: Correct isomer not identified.

^g: The mass number (*m/z*) and relative intensity (%) of the major mass spectral peaks are shown. No. 19: 140 (84), 138 (81), 140 (81); No. 26: 253 (82), 196 (81), 154 (81); No. 29: 180 (83), 168 (83), 150 (82); No. 33: 41 (100), 93 (85), 121 (80); No. 46: 152 (89), 154 (85), 168 (84); No. 48: 204 (89), 204 (88), 204 (87); No. 70: 170 (84), 170 (84), 152 (82).

*: Peak area detected less than 0.005%.

** : Peak area detected more than 0.005% and less than 0.05%.