

### Certificate Of Analysis

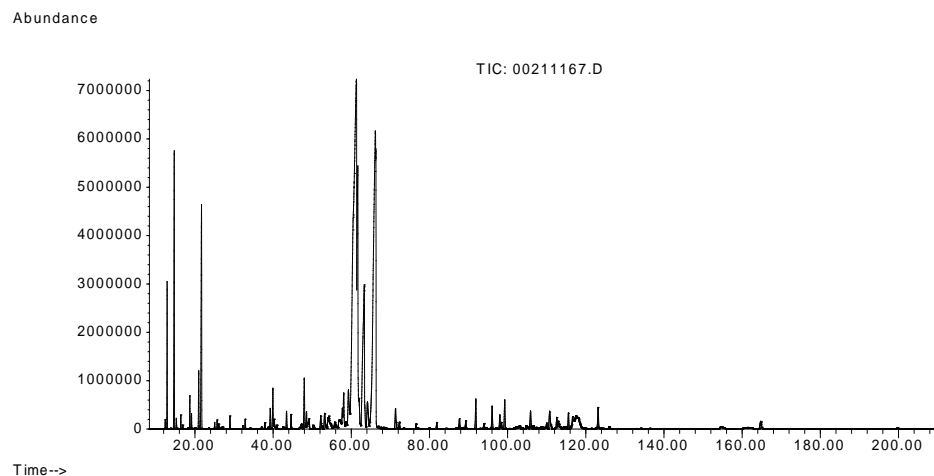
Mass spectra were recorded with a 5973 Agilent Selective detector coupled to a 6890N Agilent GC using an Agilent 50 m x 0.2 mm fused silica column coated with 0.33  $\mu$ m FFAP (crosslinked). The GC was operated under the following conditions: injector temp.: 250°C; oven temp. programmed: 60°C held for one min to 115°C at 2.5°C per min, then to 210°C at 1.0°C per min and held for 30 min; injection size: 1 $\mu$ L (~50% solution in spectroscopy grade n-pentane) split 1:10. The MSD EI was operated under the following conditions: electron impact source 70 eV, 250°C.

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Sample: ginger #HD/O/G/011-2013  
Species: *Zingiber officinale*  
Client: Lisa Easler  
(<http://achs.edu/>)  
Date: 2/12/2016

Comments: The composition of the oil corresponds from the expected natural variation of *Zingiber officinale* oil. No adulteration was detected. Odor quality is good.

RT	Component	Area % by GC/MS
12.49	tricyclene	0.08
12.89	alpha-pinene	1.42
14.70	camphene	3.65
16.39	beta-pinene	0.14
16.89	sabinene	0.04
18.70	myrcene	0.33
19.12	alpha-phellandrene	0.16
20.97	limonene	0.74
21.68	beta-phellandrene	3.89
23.48	gamma-terpinene	0.01
25.04	<i>p</i> -cymene	0.07
25.69	terpinolene	0.10
28.97	6-methyl-5-hepten-2-one	0.15
32.33	2-nonanone	0.04
32.87	rosefuran	0.12
39.29	cyclosativene	0.36
39.94	alpha-copaene	0.66
40.26	n-necanal	0.22
42.50	camphor	0.03
43.44	linalool	0.27
47.97	beta-elemene	0.99
48.54	2-undecanone	0.34
48.98	terpinen-4-ol	-0.18
49.22	rosefuran epoxide	0.18
52.18	gamma-elemene	0.35
53-99-54.29	( <i>E</i> )-beta-farnesene	0.80
57.73	alpha-terpineol	0.46
58.05	borneol	0.83
59.27	germacrene D	1.45
61.32	alpha-zingiberene	32.53
61.67	beta-bisabolene	6.62
64.14	delta-cadinene	1.08
66.17	alpha-curcumene	21.21
72.30	geraniol	0.15
96.04	elemol	0.49
98.41	gamma-eudesmol	0.15
107.29	( <i>E</i> )-methyl isoeugenol	0.03
109.83	alpha-eudesmol	0.13
123.15	<i>trans</i> -beta-sesquiphellandrol	0.50



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