

GC/MS BATCH NUMBER: MI0100

ESSENTIAL OIL: MANDARIN ORGANIC
BOTANICAL NAME: CITRUS RETICULATA
ORIGIN: UK

| KEY CONSTITUENTS PRESENT IN THIS BATCH OF MANDARIN ORGANIC OIL | % |
|--|------|
| LIMONENE | 73.7 |
| γ-TERPINENE | 15.8 |
| α-PINENE | 2.3 |
| MYRCENE | 1.9 |
| β-PINENE | 1.5 |
| p-CYMENE | 0.8 |
| DIMETHYL ANTHRANILATE | 0.4 |
| α-SINENSAL | 0.2 |
| LINALOOL | 0.1 |
| OCTANAL | 0.1 |
| DECANAL | 0.08 |

Comments from Robert Tisserand: An exquisite Mandarin oil. Conforms to 9 of 11 key ISO constituents for green Italian Mandarin oil, with gamma-terpinene and para-cymene being marginal, which is not a concern.

Date : May 18, 2016

SAMPLE IDENTIFICATION

Internal code : 16E04-PTH4-1-SM

Customer identification : Organic Mandarin - UK - MI0100512

Type : Essential oil

Source : *Citrus reticulata*

Customer : Plant Therapy

ANALYSIS

Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Analyst : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2016-05-18

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

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IDENTIFIED COMPOUNDS

| Identification | Column: BP5 | | | Column: WAX | | | Molecular Class |
|-------------------------------------|-------------|------|---------------|---------------|------|-------|----------------------|
| | R.T. | R.I. | % | % | R.I. | R.T. | |
| α -Thujene | 3.23 | 922 | 0.70 | 0.96 | 960 | 0.95 | Monoterpene |
| α -Pinene | 3.33 | 928 | 2.27 | 2.00 | 952 | 0.91 | Monoterpene |
| Camphene | 3.61 | 945 | 0.01 | 0.01 | 1006 | 1.14 | Monoterpene |
| Sabinene | 4.03 | 971 | 0.24 | 0.23 | 1061 | 1.59 | Monoterpene |
| β -Pinene | 4.10 | 974 | 1.52 | 1.50 | 1044 | 1.45 | Monoterpene |
| Myrcene | 4.38 | 991 | 1.87 | 1.86 | 1120 | 2.09 | Monoterpene |
| α -Phellandrene | 4.64 | 1007 | 0.07 | 0.05 | 1113 | 2.03 | Monoterpene |
| Octanal | 4.76 | 1013 | 0.11 | 0.10 | 1237 | 3.53 | Aliphatic aldehyde |
| α -Terpinene | 4.83 | 1017 | 0.24 | 0.27 | 1127 | 2.18 | Monoterpene |
| Limonene | 5.16* | 1035 | 74.56 | 73.73 | 1155 | 2.52 | Monoterpene |
| para-Cymene | 5.16* | 1035 | [74.56] | 0.83 | 1215 | 3.21 | Monoterpene |
| 1,8-Cineole | 5.16* | 1035 | [74.56] | 0.19 | 1156 | 2.53 | Monoterp. ether |
| <i>cis</i> - β -Ocimene | 5.18 | 1037 | 0.01 | 15.88 | 1200 | 3.03* | Monoterpene |
| <i>trans</i> - β -Ocimene | 5.42 | 1050 | 0.02 | 0.01 | 1210 | 3.15 | Monoterpene |
| γ -Terpinene | 5.64 | 1062 | 15.88 | [15.88] | 1200 | 3.03* | Monoterpene |
| <i>cis</i> -Sabinene hydrate | 5.91 | 1077 | 0.02 | 0.02 | 1414 | 6.06 | Monoterp. alcohol |
| Octanol | 6.02 | 1084 | 0.02 | 0.03 | 1510 | 7.90 | Aliphatic alcohol |
| Terpinolene | 6.07 | 1086 | 0.58 | 0.56 | 1230 | 3.42 | Monoterpene |
| Linalool | 6.48 | 1107 | 0.16 | 0.14 | 1500 | 7.70 | Monoterp. alcohol |
| Nonanal | 6.63 | 1112 | 0.02 | 0.02 | 1343 | 5.01 | Aliphatic aldehyde |
| <i>cis</i> -Limonene oxide | 7.17 | 1132 | 0.02 | 0.02 | 1378 | 5.53 | Monoterp. ether |
| <i>trans</i> -Limonene oxide | 7.28 | 1137 | 0.01 | 0.01 | 1391 | 5.71 | Monoterp. ether |
| Citronellal | 7.76 | 1155 | 0.02 | 0.02 | 1421 | 6.20 | Monoterp. aldehyde |
| Terpinen-4-ol | 8.49 | 1182 | 0.11 | 0.12 | 1534 | 8.55 | Monoterp. alcohol |
| α -Terpineol | 9.07 | 1203 | 0.19 | 0.19 | 1630 | 11.65 | Monoterp. alcohol |
| Decanal | 9.51* | 1213 | 0.08 | 0.07 | 1443 | 6.60 | Aliphatic aldehyde |
| <i>trans</i> -Piperitol | 9.51* | 1213 | [0.08] | 0.03 | 1675 | 13.67 | Monoterp. alcohol |
| Nerol | 10.66 | 1239 | 0.07 | 0.07 | 1732 | 16.47 | Monoterp. alcohol |
| β -Caryophyllene | 19.98 | 1403 | 0.06 | 0.09 | 1528 | 8.38 | Sesquiterpene |
| Dimethyl anthranilate | 20.27 | 1407 | 0.36 | 0.32 | 1934 | 29.51 | Phenolic ester |
| (<i>E,E</i>)- α -Farnesene | 28.36 | 1505 | 0.13 | 0.14 | 1697 | 14.69 | Sesquiterpene |
| α -Sinensal | 41.29 | 1753 | 0.23 | 0.22 | 2226 | 41.30 | Sesquiterp. aldehyde |
| Total identified | | | 99.58% | 99.69% | | | |

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

Note: no correction factor was applied

OTHER DATA

Physical aspect : Brownish yellow liquid

Refractive index : 1.4740 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent were detected using this method.



