



**PLANT THERAPY**  
100% PURE ESSENTIAL OILS

**GC/MS BATCH NUMBER: O20106**

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**ESSENTIAL OIL:** ORANGE (SWEET)  
**BOTANICAL NAME:** CITRUS SINENSIS  
**ORIGIN:** USA

| KEY CONSTITUENTS PRESENT IN THIS BATCH OF ORANGE (SWEET) OIL | %    |
|--|------|
| LIMONENE   | 95.4 |
| MYRCENE  | 1.9  |

Comments from Robert Tisserand: Has a fresh, zesty kick without being over-sweet. All twelve key ISO constituents are within range of the standard.

**Date :** October 23, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17J16-PTH3-1-CC

**Customer identification :** Sweet Orange - USA - O2010675R

**Type :** Essential oil

**Source :** *Citrus sinensis*

**Customer :** Plant Therapy

*ANALYSIS*

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

Identifications double-checked by GC-MS

**Analyst :** Sylvain Mercier, M. Sc., chimiste

**Analysis date :** 2017-10-23

Checked and approved by :

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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.   |                      |
| $\alpha$ -Thujene           | 3.32        | 921  | tr      | 0.55        | 956  | 1.18*  | Monoterpene          |
| $\alpha$ -Pinene            | 3.42        | 927  | 0.53    | [0.55]      | 956  | 1.18*  | Monoterpene          |
| Sabinene                    | 4.14        | 969  | 0.31    | 0.30        | 1058 | 2.02   | Monoterpene          |
| $\beta$ -Pinene             | 4.21        | 973  | 0.02    | 0.02        | 1043 | 1.85   | Monoterpene          |
| Myrcene                     | 4.49        | 990  | 1.93    | 1.94        | 1121 | 2.62*  | Monoterpene          |
| $\Delta$ 3-Carene           | 4.77*       | 1005 | 0.11    | 0.06        | 1099 | 2.34   | Monoterpene          |
| $\alpha$ -Phellandrene      | 4.77*       | 1005 | [0.11]  | [1.94]      | 1121 | 2.62*  | Monoterpene          |
| Octanal                     | 4.88        | 1012 | 0.21    | 0.22        | 1235 | 4.18   | Aliphatic aldehyde   |
| Limonene                    | 5.32*       | 1035 | 93.67   | 95.41       | 1159 | 3.12   | Monoterpene          |
| para-Cymene                 | 5.32*       | 1035 | [93.67] | 0.03        | 1208 | 3.77*  | Monoterpene          |
| cis- $\beta$ -Ocimene       | 5.38        | 1039 | 0.01    |             |      |        | Monoterpene          |
| trans- $\beta$ -Ocimene     | 5.55        | 1048 | 0.03    | [0.03]      | 1208 | 3.77*  | Monoterpene          |
| Octanol                     | 6.22*       | 1084 | 0.08    | 0.09        | 1506 | 9.24   | Aliphatic alcohol    |
| Terpinolene                 | 6.22*       | 1084 | [0.08]  | 0.01        | 1229 | 4.09   | Monoterpene          |
| Linalool                    | 6.72        | 1107 | 0.45    | 0.45        | 1498 | 9.01   | Monoterp. alcohol    |
| Nonanal                     | 6.80        | 1110 | 0.04    | 0.03        | 1339 | 5.76   | Aliphatic aldehyde   |
| cis-Limonene oxide          | 7.38        | 1131 | tr      |             |      |        | Monoterp. ether      |
| trans-Limonene oxide        | 7.49        | 1135 | 0.01    |             |      |        | Monoterp. ether      |
| Citronellal                 | 8.00        | 1153 | 0.07    | 0.06        | 1418 | 7.13   | Monoterp. aldehyde   |
| $\alpha$ -Terpineol         | 9.52        | 1204 | 0.07    | 0.07        | 1623 | 13.81* | Monoterp. alcohol    |
| Decanal                     | 9.83        | 1211 | 0.21    | 0.24        | 1441 | 7.64   | Aliphatic aldehyde   |
| Neral                       | 11.21       | 1242 | 0.06    | 0.06        | 1601 | 12.73  | Monoterp. aldehyde   |
| Geranial                    | 12.73       | 1275 | 0.10    | 0.14        | 1648 | 15.11* | Monoterp. aldehyde   |
| $\alpha$ -Copaene           | 17.75       | 1358 | 0.02    | 0.01        | 1425 | 7.30   | Sesquiterpene        |
| $\beta$ -Cubebene           | 18.74       | 1373 | 0.02    | 0.01        | 1480 | 8.60   | Sesquiterpene        |
| $\beta$ -Caryophyllene      | 20.66       | 1401 | 0.02    | 0.05        | 1522 | 9.84*  | Sesquiterpene        |
| $\beta$ -Copaene            | 21.58       | 1412 | 0.03    | [0.05]      | 1522 | 9.84*  | Sesquiterpene        |
| Dodecanal                   | 21.80       | 1415 | 0.04    | [0.14]      | 1648 | 15.11* | Aliphatic aldehyde   |
| Germacrene D                | 25.68       | 1461 | 0.02    | [0.07]      | 1623 | 13.81* | Sesquiterpene        |
| $\alpha$ -Selinene          | 26.69       | 1473 | 0.03    | 0.04        | 1634 | 14.37  | Sesquiterpene        |
| Valencene                   | 27.85       | 1487 | 0.01    | 0.02        | 1671 | 16.31  | Sesquiterpene        |
| $\delta$ -Cadinene          | 29.42       | 1507 | 0.02    | 0.01        | 1679 | 16.71  | Sesquiterpene        |
| $\beta$ -Sinensal           | 39.84       | 1694 | 0.04    | 0.04        | 2128 | 40.67  | Sesquiterp. aldehyde |
| $\alpha$ -Sinensal          | 41.79       | 1755 | 0.03    | 0.03        | 2229 | 43.25  | Sesquiterp. aldehyde |
| Nootkatone                  | 43.10       | 1796 | 0.06    | 0.04        | 2421 | 47.51  | Sesquiterp. ketone   |
| Tangeretin                  | 70.38       | 3173 | 0.17    |             |      |        | Flavonoid            |
| Heptamethoxyflavone isomer? | 73.33       | 3346 | 0.57    |             |      |        | Flavonoid            |

|                            |       |      |               |               |  |           |
|----------------------------|-------|------|---------------|---------------|--|-----------|
| Hexamethoxyflavone isomer? | 73.64 | 3362 | 0.52          |               |  | Flavonoid |
| <b>Total identified</b>    |       |      | <b>99.51%</b> | <b>99.93%</b> |  |           |

\*: 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

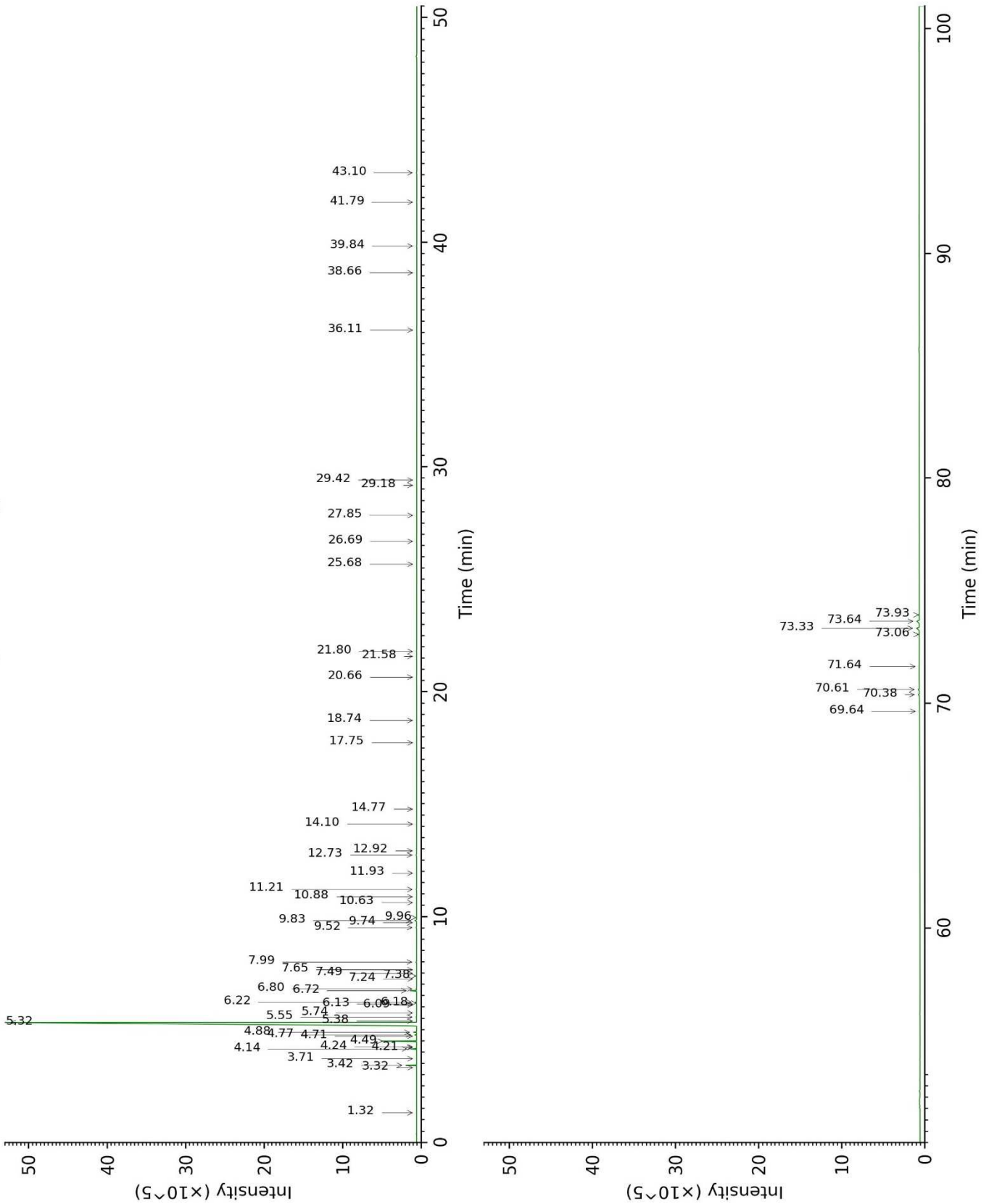
**Physical aspect :** Yellow liquid

**Refractive index :** 1.4723 ± 0.0003 (20 °C)

#### CONCLUSION

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

17J16-PTH3-1-CC\_BP5



17J16-PTH3-1-CC\_WAX

