



**PLANT THERAPY**  
100% PURE ESSENTIAL OILS

## GC/MS BATCH NUMBER: PF0101

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**ESSENTIAL OIL:** PEPPERMINT WESTERN US

**BOTANICAL NAME:** MENTHA X PIPERITA

**ORIGIN:** USA

| KEY CONSTITUENTS PRESENT IN THIS BATCH OF PEPPERMINT WESTERN US OIL | %    |
|---|------|
| MENTHOL   | 45.8 |
| MENTHONE  | 8.0  |
| MENTHYL ACETATE   | 5.4  |
| 1,8-CINEOLE   | 5.0  |
| MENTHOFURAN   | 4.3  |
| NEO-MENTHOL   | 2.8  |
| ISOMENTHONE   | 2.7  |
| β-CARYOPHYLLENE   | 1.8  |
| LIMONENE + β-PHELLANDRENE   | 1.6  |
| GERMACRENE D  | 1.6  |
| PULEGONE  | 1.1  |

Comments from Robert Tisserand: Excellent fresh, mint candy odor profile. All twelve key ISO constituents are within range except for sabinyl acetate, which is typical for Peppermint oil.

**Date :** May 29, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17E19-PTH16-1-DM

**Customer identification :** Peppermint West - USA - PF010156R

**Type :** Essential oil

**Source :** *Mentha x piperita*

**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 :** 2017-05-29

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.   |                    |
| Ethanol                     | 0.35        | 632  | 0.02   | 0.02        | 790  | 0.66   | Aliphatic alcohol  |
| Isovaleral                  | 0.67        | 674  | 0.03   | 0.03        | 749  | 0.62   | Aliphatic aldehyde |
| 2-Methylbutyral             | 0.71        | 679  | 0.02   | 0.01        | 741  | 0.61   | Aliphatic aldehyde |
| Isoamyl alcohol             | 1.14        | 736  | 0.03   | 1.46        | 1141 | 2.72*  | Aliphatic alcohol  |
| 2-Methylbutyl alcohol       | 1.16        | 739  | 0.04   | [1.46]      | 1141 | 2.72*  | Aliphatic alcohol  |
| cis-Hex-3-en-1-ol           | 2.47        | 864  | 0.04   | 0.02        | 1324 | 5.26   | Aliphatic alcohol  |
| Hexanol                     | 2.70        | 882  | 0.02   | 0.01        | 1299 | 4.90   | Aliphatic alcohol  |
| 2,5-Diethyltetrahydrofuran  | 2.91        | 898  | 0.02   | 0.01        | 972  | 1.21   | Furan              |
| $\alpha$ -Thujene           | 3.31        | 922  | 0.04   | 0.05        | 954  | 1.12   | Monoterpene        |
| $\alpha$ -Pinene            | 3.41        | 929  | 0.63   | 0.59        | 944  | 1.08   | Monoterpene        |
| Camphene                    | 3.70        | 946  | 0.02   | 0.02        | 1008 | 1.35   | Monoterpene        |
| 3-Methylcyclohexanone       | 4.01        | 964  | 0.02   | 0.02        | 1246 | 4.13   | Aliphatic ketone   |
| Sabinene                    | 4.13        | 971  | 0.44   | 0.42        | 1060 | 1.85   | Monoterpene        |
| $\beta$ -Pinene             | 4.19        | 975  | 0.91   | 0.85        | 1044 | 1.69   | Monoterpene        |
| Myrcene                     | 4.46*       | 991  | 0.32   | 0.19        | 1116 | 2.39   | Monoterpene        |
| Octen-3-ol                  | 4.46*       | 991  | [0.32] | 0.15        | 1398 | 6.42   | Aliphatic alcohol  |
| $\alpha$ -Phellandrene      | 4.75*       | 1008 | 0.27   | 0.01        | 1111 | 2.33   | Monoterpene        |
| Octan-3-ol                  | 4.75*       | 1008 | [0.27] | 0.26        | 1346 | 5.61   | Aliphatic alcohol  |
| $\Delta$ 3-Carene           | 4.75*       | 1008 | [0.27] | 0.01        | 1109 | 2.31   | Monoterpene        |
| $\alpha$ -Terpinene         | 4.93        | 1017 | 0.21   | 0.19        | 1123 | 2.48   | Monoterpene        |
| para-Cymene                 | 5.12        | 1028 | 0.12   | 0.12        | 1207 | 3.58   | Monoterpene        |
| Limonene                    | 5.16*       | 1030 | 1.60   | [1.46]      | 1141 | 2.72*  | Monoterpene        |
| $\beta$ -Phellandrene       | 5.16*       | 1030 | [1.60] | [1.46]      | 1141 | 2.72*  | Monoterpene        |
| 1,8-Cineole                 | 5.23        | 1033 | 4.99   | 5.14        | 1147 | 2.80   | Monoterp. ether    |
| cis- $\beta$ -Ocimene       | 5.33        | 1039 | 0.28   | 0.20        | 1185 | 3.29   | Monoterpene        |
| trans- $\beta$ -Ocimene     | 5.51        | 1049 | 0.08   | 0.06        | 1201 | 3.49   | Monoterpene        |
| $\gamma$ -Terpinene         | 5.70        | 1059 | 0.37   | 0.41        | 1186 | 3.31   | Monoterpene        |
| cis-Linalool oxide (fur.)   | 5.97        | 1074 | 0.01   | 0.01        | 1376 | 6.08   | Monoterp. alcohol  |
| cis-Sabinene hydrate        | 6.01        | 1076 | 0.93   | 1.13        | 1407 | 6.57*  | Monoterp. alcohol  |
| Terpinolene                 | 6.18        | 1085 | 0.14   | 0.11        | 1223 | 3.79   | Monoterpene        |
| trans-Linalool oxide (fur.) | 6.29        | 1092 | 0.01   | [1.13]      | 1407 | 6.57*  | Monoterp. alcohol  |
| Linalool                    | 6.63        | 1107 | 0.37   | 0.42        | 1494 | 8.48*  | Monoterp. alcohol  |
| cis-para-Menth-2-en-1-ol    | 7.17        | 1126 | 0.08   | [0.42]      | 1494 | 8.48*  | Monoterp. alcohol  |
| Isopulegol                  | 7.77        | 1149 | 0.16   | [0.42]      | 1494 | 8.48*  | Monoterp. alcohol  |
| Menthone                    | 8.06        | 1159 | 17.98  | 18.02       | 1394 | 6.35   | Monoterp. ketone   |
| Menthofuran                 | 8.17        | 1163 | 4.27   | 3.97        | 1410 | 6.61   | Monoterp. ether    |
| Isomenthone                 | 8.26        | 1166 | 2.72   | 2.74        | 1417 | 6.71*  | Monoterp. ketone   |
| neo-Menthol                 | 8.45        | 1174 | 2.84   | 2.85        | 1534 | 9.57   | Monoterp. alcohol  |
| Borneol                     | 8.52        | 1176 | 0.09   | 1.51        | 1625 | 12.88* | Monoterp. alcohol  |
| trans-Isopulegone           | 8.57        | 1178 | 0.17   | 5.65        | 1500 | 8.64*  | Monoterp. ketone   |
| Menthol                     | 9.00*       | 1194 | 46.08  | 45.76       | 1581 | 11.28  | Monoterp. alcohol  |

|                         |       |      |               |               |      |        |                     |
|-------------------------|-------|------|---------------|---------------|------|--------|---------------------|
| Terpinen-4-ol           | 9.00* | 1194 | [46.08]       | 0.71          | 1531 | 9.45   | Monoterp. alcohol   |
| Isomenthol              | 9.10  | 1197 | 0.53          | 0.54          | 1557 | 10.39  | Monoterp. alcohol   |
| neoiso-Menthol          | 9.25  | 1202 | 0.17          | 0.70          | 1628 | 12.98* | Monoterp. alcohol   |
| α-Terpineol             | 9.40  | 1205 | 0.22          | [0.70]        | 1628 | 12.98* | Monoterp. alcohol   |
| Pulegone                | 10.91 | 1238 | 1.07          | 1.05          | 1552 | 10.20  | Monoterp. ketone    |
| Carvone                 | 11.29 | 1247 | 0.05          | 0.03          | 1636 | 13.39  | Monoterp. ketone    |
| Piperitone              | 11.67 | 1255 | 0.46          | [0.70]        | 1628 | 12.98* | Monoterp. ketone    |
| neo-Menthyl acetate     | 12.32 | 1270 | 0.25          | 0.23          | 1464 | 7.77   | Monoterp. ester     |
| Menthyl acetate         | 13.33 | 1292 | 5.42          | [5.65]        | 1500 | 8.64*  | Monoterp. ester     |
| Isomenthyl acetate      | 13.94 | 1304 | 0.21          | 0.24          | 1509 | 8.85   | Monoterp. ester     |
| Bicycloelemene          | 14.40 | 1311 | 0.04          | [2.74]        | 1417 | 6.71*  | Sesquiterpene       |
| Menthofuro lactone      | 16.77 | 1347 | 0.04          |               |      |        | Monoterp. lactone   |
| Eugenol                 | 17.30 | 1355 | 0.02          | 0.05          | 2061 | 37.73  | Phenylpropanoid     |
| α-Copaene               | 17.60 | 1359 | 0.03          | 0.05          | 1425 | 6.87   | Sesquiterpene       |
| β-Bourbonene            | 18.01 | 1366 | 0.20          | 0.25          | 1452 | 7.51   | Sesquiterpene       |
| β-Elemene               | 18.79 | 1378 | 0.06          | 1.90          | 1524 | 9.21*  | Sesquiterpene       |
| β-Caryophyllene         | 20.48 | 1403 | 1.82          | [1.90]        | 1524 | 9.21*  | Sesquiterpene       |
| β-Copaene               | 21.36 | 1413 | 0.05          | 0.07          | 1503 | 8.72   | Sesquiterpene       |
| α-Humulene              | 23.20 | 1435 | 0.07          | 0.13          | 1585 | 11.43  | Sesquiterpene       |
| trans-β-Farnesene       | 24.37 | 1449 | 0.25          | 0.26          | 1618 | 12.62  | Sesquiterpene       |
| Germacrene D            | 25.44 | 1462 | 1.56          | [1.51]        | 1625 | 12.88* | Sesquiterpene       |
| Bicyclogermacrene       | 26.64 | 1477 | 0.26          | 0.24          | 1644 | 13.77  | Sesquiterpene       |
| δ-Cadinene              | 29.09 | 1507 | 0.05          | 0.05          | 1674 | 15.32  | Sesquiterpene       |
| Viridiflorol            | 34.53 | 1583 | 0.13          | 0.13          | 1982 | 34.44  | Sesquiterp. alcohol |
| <b>Total identified</b> |       |      | <b>99.33%</b> | <b>99.05%</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

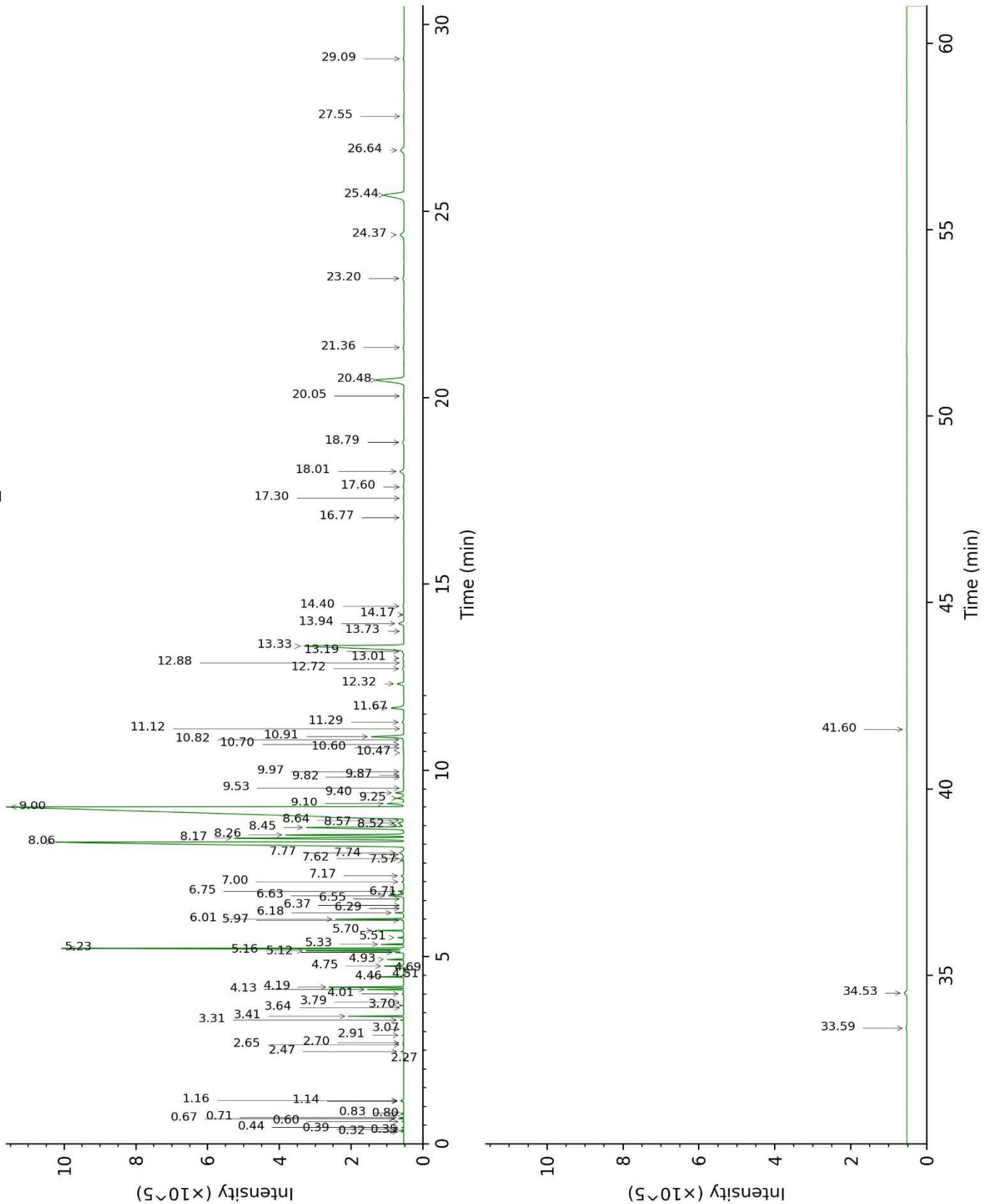
**Physical aspect :** Clear liquid

**Refractive index :** 1.4605 ± 0.0003 (20 °C)

#### CONCLUSION

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

17E19-PTH16-1-DM\_BP5



17E19-PTH16-1-DM\_WAX

