

GC/MS BATCH NUMBER: CA4100

ESSENTIAL OIL: CHAMOMILE GERMAN CO2

BOTANICAL NAME: MATRICARIA RECUTITA

ORIGIN: GERMANY

| KEY CONSTITUENTS PRESENT IN THIS BATCH OF GERMAN CHAMOMILE OIL | % |
|--|-----|
| cis-SPIROETHER | 6.9 |
| α-BISABOLOL | 6.5 |
| LINOLEIC ACID | 6.4 |
| trans-β-FARNESENE | 3.6 |
| OLEIC ACID | 3.5 |
| TRIACONTANE | 3.2 |
| PALMITIC ACID | 2.8 |
| trans-SPIROETHER | 1.6 |
| UNTRIACONTANE | 1.1 |

Comments from Robert Tisserand: German Chamomile CO2 extract is preferred by many for topical use. The lab report cites herniarin (only 1% of the extract) as being a possible allergen. I would add that, in my opinion, the evidence for herniarin being an allergen is not very solid. The 0.7% chamazulene is actually matricin, but this shows as chamazulene on lab reports.

Date : August 19, 2016

SAMPLE IDENTIFICATION

Internal code : 16G22-PTH9-1-DM

Customer identification : Chamomile Co2 - Germany - CA410063R

Type : Essential oil

Source : *Matricaria recutita*

Customer : Plant Therapy

ANALYSIS

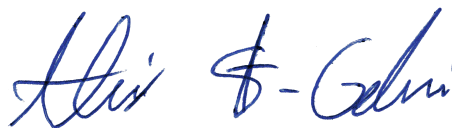
Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

Analyst : Alexis St-Gelais, M. Sc., chimiste

Analysis date : 2016-07-26

Checked and approved by :



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

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This report is digitally signed, it is only considered valid if the digital signature is intact.

IDENTIFIED COMPOUNDS

| Identification | Column: BP5 | | | Column: WAX | | | Molecular Class |
|-------------------------|-------------|------|---------------|---------------|------|--------|---------------------|
| | R.T. | R.I. | % | % | R.I. | R.T. | |
| Sabinene | 4.06 | 967 | 0.02 | 0.01 | 1060 | 1.53 | Monoterpene |
| para-Cymene | 5.08 | 1026 | 0.02 | 0.02 | 1212 | 3.10 | Monoterpene |
| 1,8-Cineole | 5.15 | 1030 | 0.02 | 0.02 | 1147 | 2.36 | Monoterp. ether |
| Artemisia ketone | 5.71 | 1061 | 0.04 | 0.04 | 1293 | 4.22 | Monoterp. ketone |
| Carvone | 11.18 | 1244 | 0.03 | 0.10 | 1639 | 11.60* | Monoterp. ketone |
| (E)-Anethole | 13.26 | 1290 | 0.07 | 0.05 | 1738 | 16.09 | Phenylpropanoid |
| α-Isocomene | 17.91 | 1363 | 0.02 | 0.01 | 1453 | 6.67 | Sesquiterpene |
| β-Caryophyllene | 20.16 | 1397 | 0.06 | 0.05 | 1529 | 8.20 | Sesquiterpene |
| Capric acid | 22.36 | 1424 | 0.17 | 0.17 | 2222 | 40.46 | Fatty acid |
| trans-β-Farnesene | 24.26 | 1447 | 3.55 | 3.41 | 1630 | 11.27* | Sesquiterpene |
| Germacrene D | 25.15* | 1458 | 0.32 | [3.41] | 1630 | 11.27* | Sesquiterpene |
| Precocene I | 25.15* | 1458 | [0.32] | | | | Chromene |
| β-Selinene | 25.73 | 1465 | 0.08 | [3.41] | 1630 | 11.27* | Sesquiterpene |
| Bicyclgermacrene | 26.36 | 1471 | 0.08 | [0.10] | 1639 | 11.60* | Sesquiterpene |
| δ-Cadinene | 28.65 | 1499 | 0.07 | 0.04 | 1684 | 13.60 | Sesquiterpene |
| (E,E)-α-Farnesene | 28.81 | 1502 | 0.05 | 0.08 | 1703 | 14.45 | Sesquiterpene |
| Spathulenol | 33.63 | 1568 | 0.18 | 0.44 | 2033 | 34.33* | Sesquiterp. alcohol |
| α-Bisabolol oxide B | 37.59 | 1643 | 0.39 | [0.44] | 2033 | 34.33* | Sesquiterp. alcohol |
| α-Bisabolol | 39.38 | 1686 | 6.49 | 5.72 | 2154 | 38.70 | Sesquiterp. alcohol |
| Chamazulene | 40.36 | 1714 | 0.79 | 0.64 | 2248 | 41.16 | Azulene |
| Herniarin | 40.94 | 1732 | 0.88 | 1.13 | 2952 | 54.32 | Coumarin |
| α-Bisabolol oxide A | 41.26 | 1742 | 0.82 | 0.71 | 2322 | 42.84 | Sesquiterp. alcohol |
| cis-Spiroether | 45.62 | 1892 | 6.88 | 6.68 | 2794 | 51.75 | Polyyne |
| trans-Spiroether | 46.23 | 1916 | 1.62 | | | | Polyyne |
| (Z)-Tibetin spiroether | 47.18 | 1955 | 0.18 | | | | Polyyne |
| Palmitic acid | 48.52 | 2010 | 2.75 | 3.68 | 2903 | 53.56* | Fatty acid |
| Linoleic acid | 52.40 | 2181 | 6.43 | 6.52 | 3203 | 58.17 | Fatty acid |
| Oleic acid | 52.55 | 2188 | 3.50 | 3.61 | 3152 | 57.41* | Fatty acid |
| Nonacosane | 66.26 | 2926 | 0.48 | [3.68] | 2903 | 53.56* | Alkane |
| Triacontane | 67.38 | 2996 | 3.17 | 2.10 | 3069 | 56.15 | Alkane |
| Untriacontane | 69.41 | 3127 | 1.12 | [3.61] | 3152 | 57.41* | Alkane |
| Total identified | | | 40.28% | 35.23% | | | |

*: 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 : Dark green liquid

Refractive index : 1.5050 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent were detected using this method. Given that this is an extract, most of the detected peaks corresponded to a complex mixture of waxy compounds, likely including branched alkanes and alkenes, various fatty acids, fatty alcohols and triterpenes. These compounds are poorly characterized by GC-MS in available databases, hence the low identified total. The presence of henniarin should be noted, as this compound has been reported to be a potentiel allergen in chamomile extracts.

