

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8899 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

Annex A of this International Standard is for information only.

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Oil of lemon petitgrain [*Citrus limon* (Linnaeus) N.L. Burman]

1 Scope

This International Standard specifies certain characteristics of oil of lemon petitgrain [*Citrus limon* (Linnaeus) N.L. Burman], with a view to facilitating the assessment of its quality.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/R 210:1961, *Essential oils — Packing.*

ISO/R 211:1961, *Essential oils — Labelling and marking containers.*

ISO 212:1973, *Essential oils — Sampling.*

ISO 279:1981, *Essential oils — Determination of relative density at 20 °C (Reference method).*

ISO 280:1976, *Essential oils — Determination of refractive index.*

ISO 592:1981, *Essential oils — Determination of optical rotation.*

ISO 709:1980, *Essential oils — Determination of ester value.*

ISO 875:1981, *Essential oils — Evaluation of miscibility in ethanol.*

ISO 1242:1973, *Essential oils — Determination of the acid value.*

ISO 1279:1984, *Essential oils — Determination of carbonyl value — Hydroxylammonium chloride method.*

ISO 3794:1976, *Essential oils (containing tertiary alcohols) — Estimation of free alcohols content by determination of ester value after acetylation.*

ISO 7611:1985, *Oils of lemon and petitgrain citronnier, and oil of lime obtained by a mechanical process — Determination of citral (neral + geranial) content — Gas chromatographic method on capillary columns.*

3 Definition

For the purposes of this International Standard, the following definition applies.

oil of lemon petitgrain: The oil obtained by steam distillation of the leaves, twigs and small green fruits of *Citrus limon* (Linnaeus) N.L. Burman.

4 Requirements

4.1 Appearance

Clear liquid.

4.2 Colour

Pale yellow to greenish yellow.

4.3 Odour

Ethereal, lemon smell.

4.4 Relative density at 20/20 °C

Minimum: 0,865

Maximum: 0,886

4.5 Refractive index at 20 °C

Minimum: 1,472 0

Maximum: 1,476 0

4.6 Optical rotation at 20 °C

Between +14° and +35°

4.7 Miscibility in 85 % (V/V) ethanol at 20 °C

1 volume of the oil shall not require more than 3 to 6 volumes of 85 % (V/V) ethanol at 20 °C to give a clear solution. A slight opalescence may sometimes appear.

4.8 Acid value

Maximum: 2,0

4.9 Ester value

Minimum: 14

Maximum: 46

4.10 Ester value after acetylation

Minimum: 56

Maximum: 100

4.11 Carbonyl value

Minimum: 51, corresponding to 14 % of carbonyl compounds expressed as citral.

Maximum: 122, corresponding to 33 % of carbonyl compounds expressed as citral.

4.12 Typical chromatogram

See annex A, for information only.

4.13 Flash point

59 °C (for information only)

5 Sampling

See ISO 212.

Minimum volume of test sample: 50 ml.

NOTE 1 This volume is sufficient to carry out all the tests specified in this International Standard at least once.

6 Methods of test

6.1 Relative density at 20/20 °C

See ISO 279.

6.2 Refractive index at 20 °C

See ISO 280.

6.3 Optical rotation at 20 °C

See ISO 592.

6.4 Miscibility in 85 % (V/V) ethanol, at 20 °C

See ISO 875.

6.5 Acid value

See ISO 1242.

6.6 Ester value

See ISO 709.

6.7 Ester value after acetylation

See ISO 3794.

6.8 Carbonyl value

See ISO 1279.

Standing time: 15 min

Test portion: 1 g

Molecular mass of citral: $M_r = 152,2$

6.9 Establishment of a typical chromatogram

See annex A, for information only.

6.10 Flash point

Guidance on methods for the determination of the flash point will be given in a future Technical Report.

7 Packaging, labelling and marking

See ISO/R 210 and ISO/R 211.

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Annex A
(informative)

Typical chromatograms

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Sample: oil of lemon petitgrain
Column: capillary, length 25 m, diameter 0,32 mm
Stationary phase: SE 52
Film thickness: 0,4 µm to 0,45 µm
Split ratio: 1/50

Detector: flame ionization
Oven temperature: initial temperature: 65 °C for 8 min
programme of temperature rise: 3 °C/min up to
100 °C, then 2,5 °C/min up to 130 °C,
then 3 °C/min up to final temperature: 160 °C

Injection temperature: 280 °C
Carrier gas: hydrogen
Carrier gas flow rate: 1,5 ml/min
Volume injected: 1 µl

- Constituents**
- 1 Limonene
 - 2 Linalool
 - 3 Neral
 - 4 Geranial
 - 5 Neryl acetate
 - 6 Geranyl acetate

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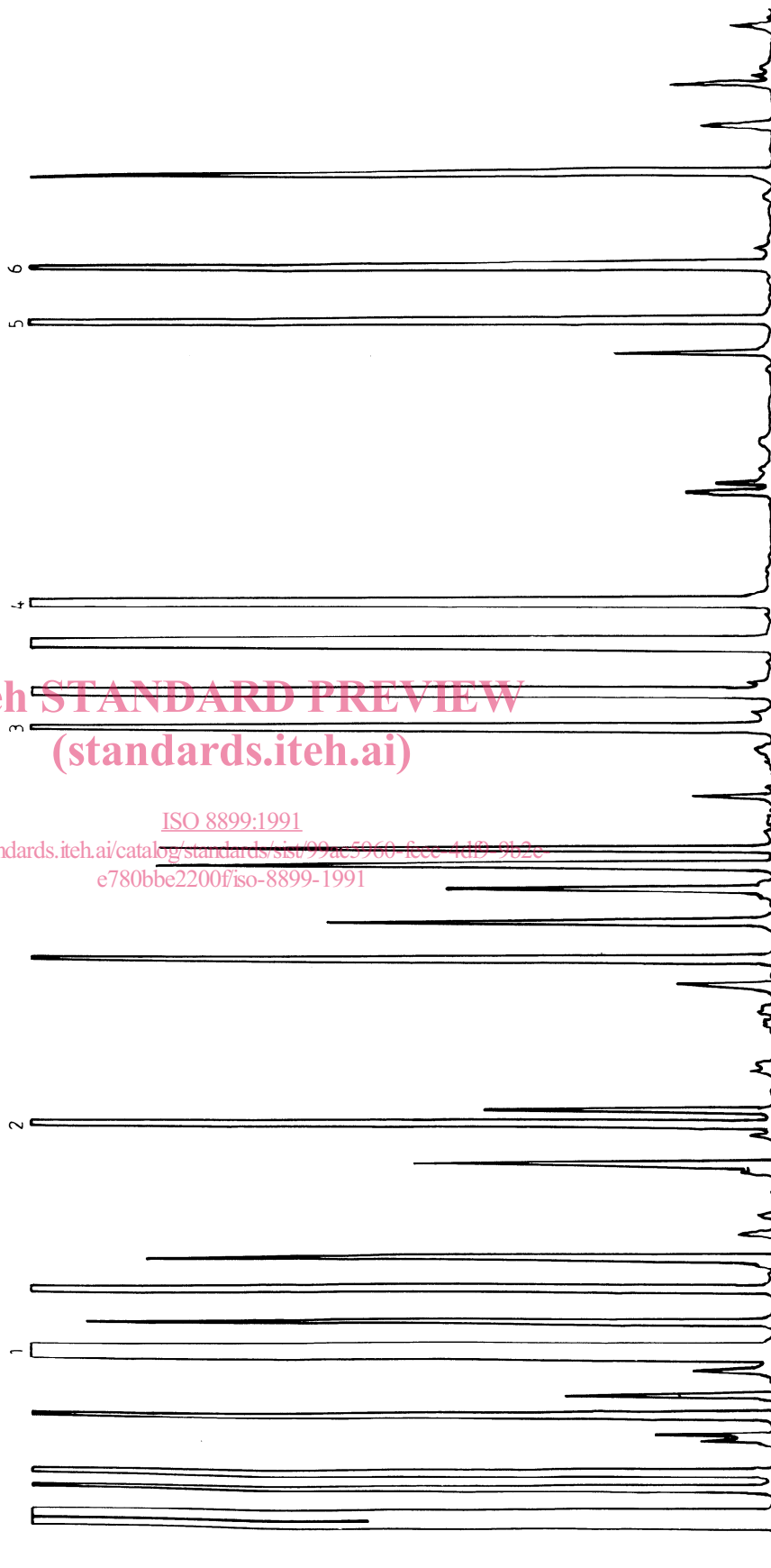


Figure A.1

Sample: oil of lemon petitgrain
 Column: fused silica capillary, length 30 m
 Stationary phase: polyethylene glycol 20 000
 Film thickness: 0,25 µm
 Split ratio: 1/100
 Detector: flame ionization
 Oven temperature:
 — initial temperature: 80 °C
 — programme of temperature rise: 2 °C/min
 — final temperature: 200 °C
 Injection temperature: 200 °C
 Detection temperature: 250 °C
 Carrier gas: helium
 Carrier gas flow rate: 1 ml/min
 Volume injected: 0,02 µl

- Constituents**
- | | | | |
|----|-------------------------|----|-----------------|
| 1 | Solvent | 12 | Citronellal |
| 2 | α-Pinene | 13 | Linalool |
| 3 | Camphene | 14 | Linalyl acetate |
| 4 | β-Pinene | 15 | Neral |
| 5 | Sabinene | 16 | α-Terpineol |
| 6 | Myrcene | 17 | Geranial |
| 7 | Limonene | 18 | Geranyl acetate |
| 8 | β-Phellandrene | 19 | Nerol |
| 9 | α-Terpinene | 20 | Geraniol |
| 10 | p-Cymene | 21 | trans-Nerolidol |
| 11 | 5-Methyl-5-hepten-2-one | | |

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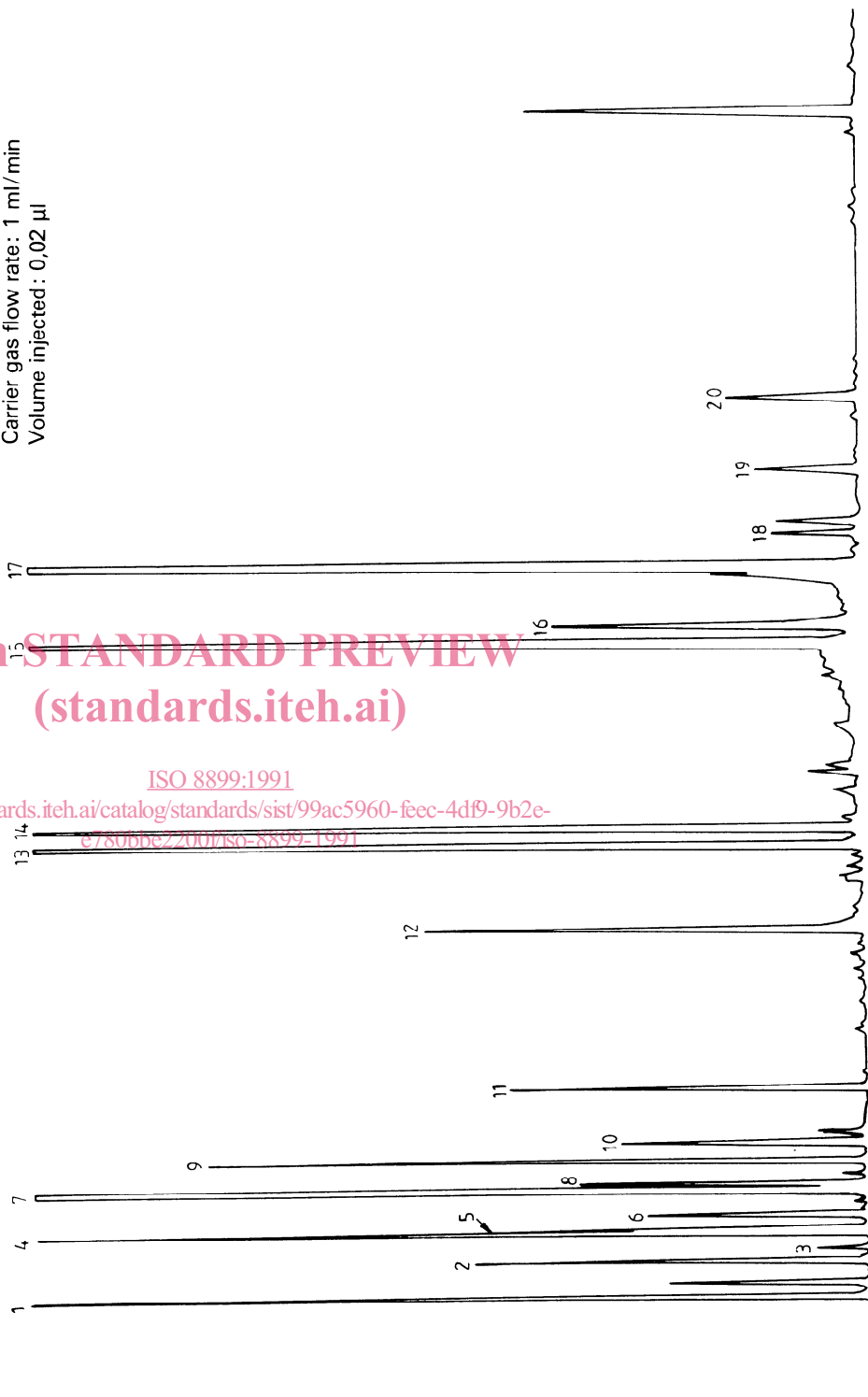


Figure A.2

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