

INTERNATIONAL
STANDARD

ISO
3519

Second edition
1997-07-15

**Oil of lime [*Citrus aurantifolia* (Christm.)
Swingle], obtained by distillation**

*Huile essentielle de lime [Citrus aurantifolia (Christm.) Swingle], obtenue
par distillation*

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ISO 3519:1997

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Reference number
ISO 3519:1997(E)

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 3519 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

This second edition cancels and replaces the first edition (ISO 3519:1976), which has been technically revised.

Annexes A and B of this International Standard are for information only.

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Oil of lime [*Citrus aurantifolia* (Christm.) Swingle], obtained by distillation

1 Scope

This International Standard specifies certain characteristics of the oil of lime [*Citrus aurantifolia* (Christm.) Swingle] obtained by distillation, in order to facilitate 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 210:—¹⁾, *Essential oils — General rules for packaging, conditioning and storage.*

ISO 211:—²⁾, *Essential oils — General rules for labelling and marking of 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 1279:1996, *Essential oils — Determination of carbonyl value — Potentiometric method using hydroxylammonium chloride.*

ISO 4715:1978, *Essential oils — Quantitative evaluation of residue on evaporation.*

3 Definition

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

3.1 oil of lime, obtained by distillation: Essential oil obtained by steam distillation of the crushed fruit of *Citrus aurantifolia* (Christm.) Swingle, of the Rutaceae family.

1) To be published. (Revision of ISO 210:1961)

2) To be published. (Revision of ISO 211:1961)

4 Requirements

4.1 Appearance

Mobile liquid, clear.

4.2 Colour

Colourless to pale yellow.

4.3 Odour

Characteristic of the oil but different from that of the fresh fruit.

4.4 Relative density at 20 °C/20 °C

Minimum: 0,856
Maximum: 0,865

4.5 Refractive index at 20 °C

Minimum: 1,474 0
Maximum: 1,478 0

4.6 Optical rotation at 20 °C

Minimum: +34°
Maximum: +45°

4.7 Residue on evaporation

Maximum: 2,5 % (m/m)

4.8 Carbonyl value

Maximum: 5,5, corresponding to 1,5 % (m/m) carbonyl compounds, expressed as citral.

4.9 Flashpoint

Information on the flashpoint is given in annex B.

5 Sampling

See ISO 212.

Minimum volume of test sample: 50 ml.

NOTE — This volume allows each of the tests specified in this International Standard to be carried out at least once.

6 Test methods

6.1 Relative density at 20 °C/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 Residue on evaporation

See ISO 4715.

Test portion: 5 g.
Evaporation time: 5 h.

6.5 Carbonyl value

See ISO 1279, method I.

Test portion: 10 g.
Standing time: 15 min.
Relative molar mass of citral: 152,2.

7 Packaging, labelling, marking and storage

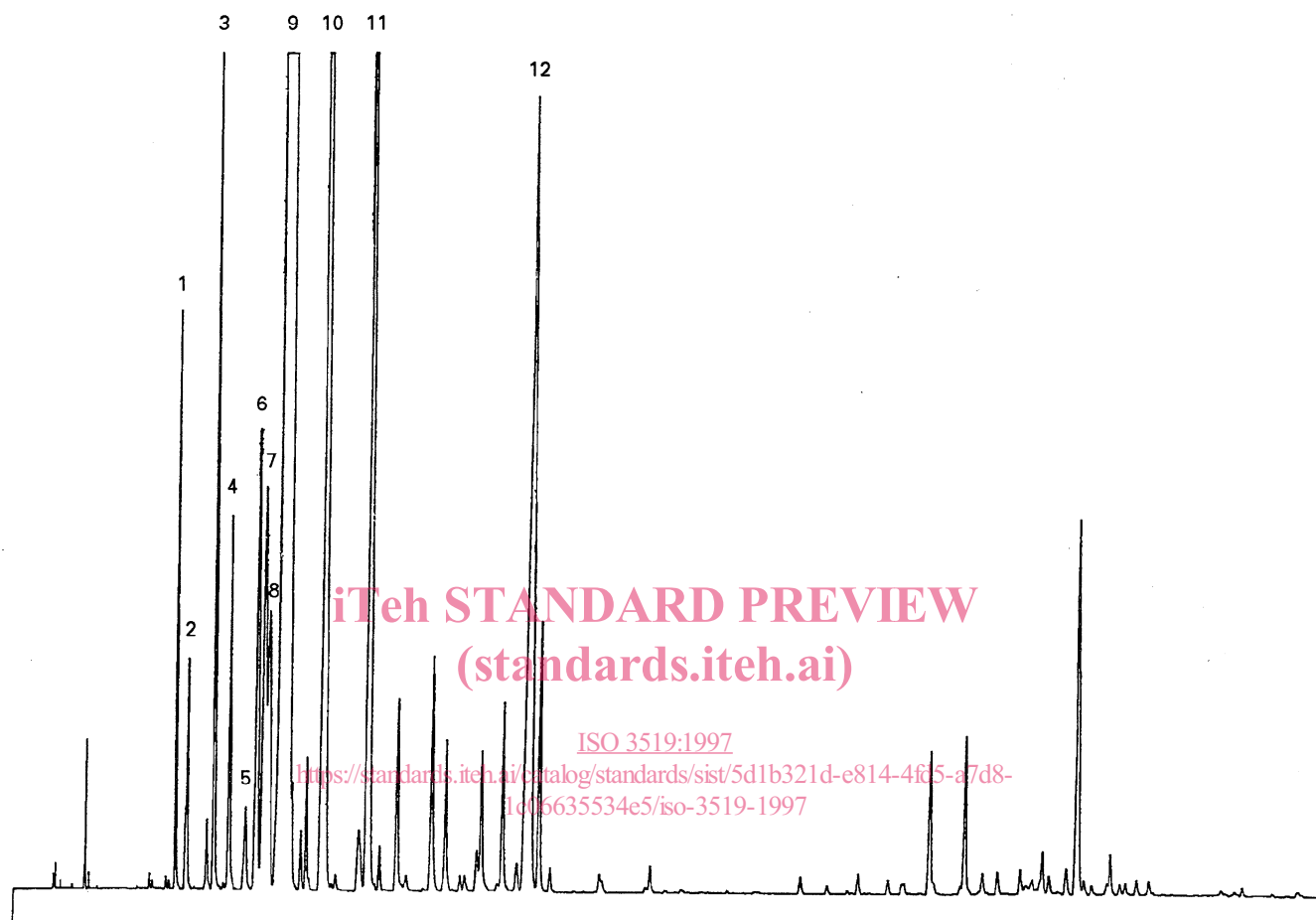
See ISO 210 and ISO 211.

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Annex A (informative)

Typical chromatograms of the essential oil of lime obtained by distillation



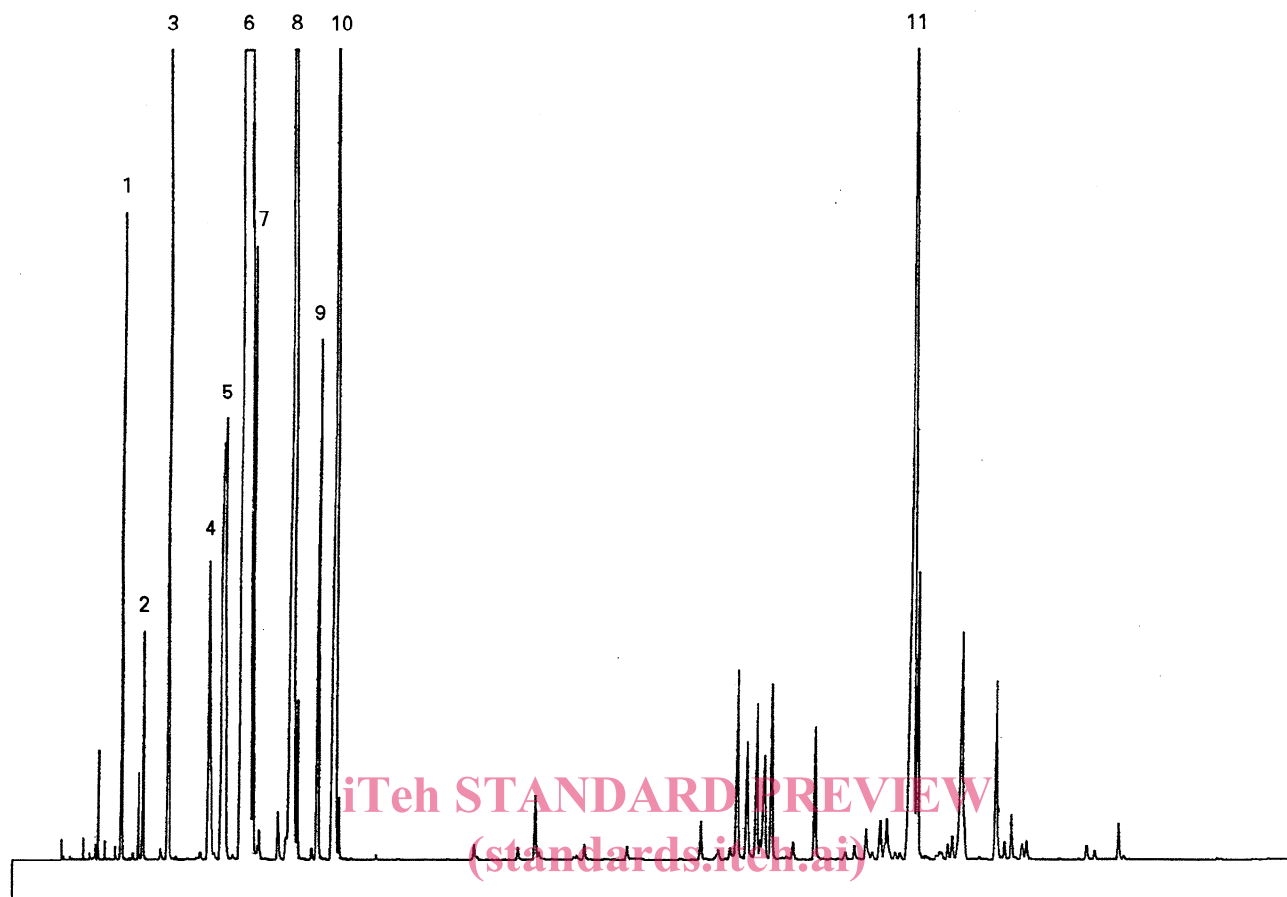
Peak identification

- 1 α -Pinene
- 2 Camphene + α -fenchene
- 3 β -Pinene
- 4 Myrcene
- 5 α -Phellandrene
- 6 1,4-Cineole
- 7 α -Terpinene
- 8 *p*-Cymene
- 9 Limonene + 1,8-cineole
- 10 γ -Terpinene
- 11 Terpinolene
- 12 α -Terpineol

Operating conditions

Column: fused silica capillary; length 50 m; diameter 0,32 mm
 Stationary phase: polydimethyl siloxane (OV 101)
 Film thickness: about 0,2 μ m
 Oven temperature: 65 °C for 5 min; then from 65 °C to 115 °C at a rate of 2 °C/min; then 115 °C to 200 °C/min at a rate of 2 °C/min
 Injector temperature: 230 °C
 Detector temperature: 250 °C
 Detector: flame ionization
 Carrier gas: hydrogen
 Flow: 60 ml/min
 Volume injected: about 0,2 μ l
 Linear velocity of carrier gas: 0,48 m/s

Figure A.1 — Typical chromatogram taken on an apolar column



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Peak identification

- 1 α -Pinene
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- 5 α -Terpinene + 1,4-cineole
- 6 Limonene
- 7 1,8-Cineole
- 8 γ -Terpinene
- 9 *p*-Cymene
- 10 Terpinolene
- 11 α -Terpineol

Operating conditions

Column: fused silica capillary; length 50 m; diameter 0,22 mm

Stationary phase: polyethylene glycol 20 000 (Carbowax 20M)

Film thickness: about 0,2 μ m

Oven temperature: 65 °C for 5 min; then from 65 °C to 155 °C at a rate of 2 °C/min; then 155 °C to 200 °C at a rate of 3 °C/min

Injector temperature: 230 °C

Detector temperature: 250 °C

Detector: flame ionization

Carrier gas: hydrogen

Volume injected: about 0,2 μ l

Flow: 60 ml/min

Linear velocity of carrier gas: 0,38 m/s

Figure A.2 — Typical chromatogram taken on a polar column

Annex B (informative)

Flashpoint

B.1 General information

For reasons of safety, transport companies, insurance companies, people in charge of safety services, etc. require information about the flashpoint of essential oils, which in most cases are inflammable products.

A comparative study on the relevant methods of analysis (see ISO/TR 11018³⁾) led to the understanding that it was hard to find a single method for standardization purposes, given that

- essential oils are varied and their chemical compositions differ to a large extent;
- the volume of the sample needed for certain test equipment is incompatible with the high price of essential oils;
- there are different types of equipment that satisfy the desired objective, but users cannot

be obliged to use one type of equipment rather than another.

Consequently, it was decided to give a mean value for the flashpoint in an informative annex in each International Standard, to meet the request of the interested parties.

If possible, the method by which this value was obtained should be specified.

For further information, see ISO/TR 11018³⁾.

B.2 Flashpoint of oil of lime obtained by distillation

The mean value is +56 °C.

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3) ISO/TR 11018:1997, *Essential oils — General guidance on the determination of flashpoint.*

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ICS 71.100.60

Descriptors: fruit and vegetable products, essential oils, lime (fruit), specifications, characteristics, chemical composition, chromatograms, tests, packaging, marking, labelling, storage.

Price based on 5 pages
