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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Oil of lime, Mexico [*Citrus aurantiifolia* (Christmann) Swingle] obtained by mechanical means

*Huile essentielle de lime, Mexique [*Citrus aurantiifolia* (Christmann) Swingle] obtenue par des procédés mécaniques*

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Reference number
ISO 3809:1987 (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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3809 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

This second edition cancels and replaces the first edition (ISO 3809 : 1976), of which it constitutes a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Oil of lime, Mexico [*Citrus aurantiifolia* (Christmann) Swingle] obtained by mechanical means

1 Scope and field of application

This International Standard specifies certain characteristics of oil of lime, Mexico [*Citrus aurantiifolia* (Christmann) Swingle] obtained by mechanical means, with a view to facilitating the assessment of its quality.

2 References

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

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

ISO 212, *Essential oils — Sampling.*

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

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

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

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

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

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

ISO 4735, *Oils of citrus — Determination of CD value by ultraviolet spectrophotometric analysis.*

ISO 7358, *Citrus oils — Determination of bergaptene content — High pressure liquid chromatographic method.¹⁾*

ISO 8432, *Essential oils — Analysis by high pressure liquid chromatography — General method.¹⁾*

3 Definitions

3.1 oil of lime, Mexico (type A): The oil obtained by centrifuging the emulsion of juice and oil obtained by crushing the whole fruits of *Citrus aurantiifolia* (Christmann) Swingle.

3.2 oil of lime, Mexico (type B): the oil obtained by centrifuging the emulsion of water and oil obtained by grating the fruits of *Citrus aurantiifolia* (Christmann) Swingle, under water spraying.

4 Requirements

Oil of lime, Mexico shall have the characteristics given in the table.

5 Sampling

See ISO 212.

Minimum volume of the final sample: 40 ml. This volume is enough 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 with 95 % (V/V) ethanol at 20 °C

See ISO 875.

1) At present at the stage of draft.

6.5 Carbonyl value

See ISO 1279.

Test sample: 5 g.

Period of standing: 15 min.

6.6 Residue on evaporation

See ISO 4715.

Test sample: 5 g.

Evaporation time: 6 h.

6.7 CD value

See ISO 4735.

Point B: about 370 nm.

Maximum value: about 312 to 315 nm.

Point A: about 280 nm.

Dilution of 0,025 g of oil in 100 ml of 95 % (V/V) ethanol.

6.8 Bergaptene content

See ISO 7358.

6.9 Establishment of the chromatographic profile

See annex.

6.10 Flash point

To be completed later.

7 Packing, labelling and marking

See ISO/R 210 and ISO/R 211.

Table

Requirement	Type A	Type B
4.1 Appearance	Clear liquid, in which a waxy precipitate may be present	
4.2 Colour	From amber to green	Dark green
4.3 Odour	Fresh, sharp	Fresh, with a note reminiscent of the pericarp
4.4 Relative density at 20/20 °C	Minimum: 0,875 Maximum: 0,884	Minimum: 0,880 Maximum: 0,888
4.5 Refractive index at 20 °C	Minimum: 1,482 0 Maximum: 1,486 0	Minimum: 1,484 5 Maximum: 1,488 5
4.6 Optical rotation at 20 °C	Between +35,0° and +41,0°	This determination is not possible because oils of this type are intensely coloured
4.7 Miscibility with 95 % (V/V) ethanol at 20 °C	Not more than 0,1 to 0,5 volumes of 95 % (V/V) ethanol at 20 °C, shall be required to give a clear solution with 1 volume of essential oil; higher dilutions may become cloudy	Not more than 0,1 to 0,25 volumes of 95 % (V/V) ethanol at 20 °C, shall be required to give a clear solution with 1 volume of essential oil; higher dilutions may become cloudy
4.8 Carbonyl value	Minimum: 16, corresponding to 4,5 % of carbonyl compounds expressed as citral Maximum: 31, corresponding to 8,5 % of carbonyl compounds expressed as citral	Minimum: 18, corresponding to 5 % of carbonyl compounds expressed as citral Maximum: 35, corresponding to 9,5 % of carbonyl compounds expressed as citral
4.9 Residue on evaporation	Minimum: 10,0 % Maximum: 14,5 %	Minimum: 13,0 % Maximum: 19,0 %
4.10 CD value	18,20 (as an indication only)	23,60 (as an indication only)
4.11 Bergaptene content	Maximum: 2 000 ppm	
4.12 Chromatographic profile	To be completed later (see the chromatograms in the annex)	
4.13 Flash point	46 °C (as an indication only)	

Annex

Typical chromatograms

(This annex does not form an integral part of the standard.)

Sample : oil of lime, Mexico, type A

Column: fused silica capillary, length 60 m, internal diameter 0,25 mm

Stationary phase: SE 30, 0,25 µm thick

Oven temperature: temperature programme: 8 min at 75 °C, then 4 °C/min up to 200 °C, then 25 min at 200 °C

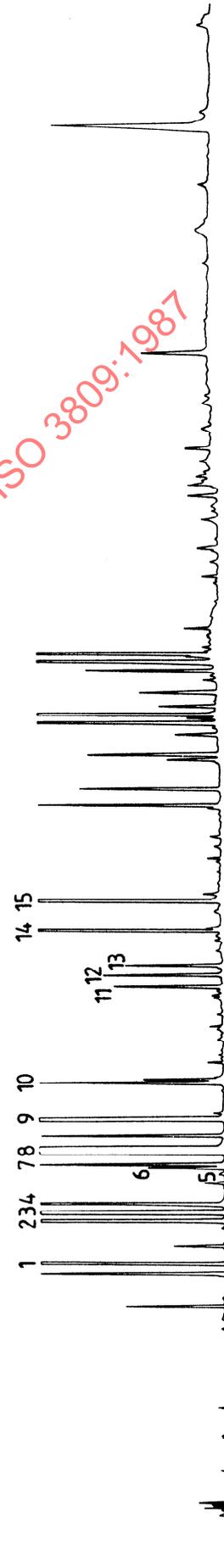
Volume injected: 0,2 µl

Split ratio: 150/1

Detector: flame ionization

Constituents

- 1 alpha-pinene
- 2 sabinene
- 3 beta-pinene
- 4 myrcene and octanal
- 5 1,4-cineole and delta-3 carene
- 6 alpha-terpinene
- 7 para-cymene
- 8 delta-limonene and 1,8-cineole
- 9 gamma-terpinene and octanol
- 10 terpinolene and nonanal
- 11 terpinene-4-ol
- 12 alpha-terpineol
- 13 decanal
- 14 neral
- 15 geranial



4 **Sample: oil of lime, Mexico, type B**

Column: fused silica capillary, length 30 m, internal diameter 0,25 mm

Stationary phase: SE 30

Oven temperature: temperature programme: 11 min at 60 °C, then 2 °C/min up to 200 °C

Volume injected: 0,05 µl

Injection temperature: 250 °C

Detection temperature: 250 °C

Carrier gas: helium

Carrier gas flow rate: 1,2 ml/min

Constituents

- 1 alpha-pinene
- 2 sabinene
- 3 beta-pinene
- 4 myrcene
- 5 alpha-terpinene
- 6 para-cymene
- 7 1,4-cineole
- 8 delta-limonene
- 9 1,8-cineole
- 10 gamma-terpinene
- 11 terpinolene
- 12 terpinene-4-ol
- 13 alpha-terpineol
- 14 decanal
- 15 neral
- 16 geranial

