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Lemon Oil

DEFINITION

Lemon Oil is the volatile oil obtained by expression, without the aid of heat, from the fresh peel of the fruit of *Citrus x limon* (L.) Osbeck (Fam. Rutaceae), with or without the previous separation of the pulp and the peel. The total aldehyde content, calculated as citral ($C_{10}H_{16}O$), is NLT 2.2% and NMT 3.8% for California-type Lemon Oil, and NLT 3.0% and NMT 5.5% for Italian-type Lemon Oil.

[Note—Do not use Lemon Oil that has a terebinthine odor.]

ASSAY

• **Total Aldehyde Content**

Reagent solution: Dissolve 4.5 g of hydroxylamine hydrochloride in 13 mL of water. Add 85 mL of tertiary butyl alcohol, mix, and adjust with 0.5 N potassium hydroxide to a pH of 3.4.

Sample: 5 mL

Analysis: Pipet 50 mL of the *Reagent solution* into a conical flask containing the *Sample*. Insert the stopper in the flask, and allow to stand at room temperature for 30 min, with occasional shaking. Titrate the liberated hydrochloric acid with 0.5 N alcoholic potassium hydroxide VS to a pH of 3.4. Each mL of 0.5 N alcoholic potassium hydroxide consumed in the titration is equivalent to 76.12 mg of total aldehydes, calculated as citral ($C_{10}H_{16}O$).

Acceptance criteria: The total aldehyde content, calculated as citral ($C_{10}H_{16}O$), is 2.2%–3.8% for California-type Lemon Oil or 3.0%–5.5% for Italian-type Lemon Oil.

SPECIFIC TESTS

• **Specific Gravity ⟨841⟩:** 0.849–0.855

• **Optical Rotation, *Angular Rotation* ⟨781A⟩:** +57° to +65.6°

• **Refractive Index ⟨831⟩:** 1.473–1.476 at 20°

• **Ultraviolet Absorbance**

Sample solution: Dilute 250 mg of Oil to 100 mL with alcohol

Blank: Alcohol

Instrumental conditions

(See *Ultraviolet-Visible Spectroscopy* ⟨857⟩.)

Mode: UV-Vis

Spectral range: 260–400 nm

Analysis

Samples: *Sample solution* and *Blank*

Record the spectrum in a 1-cm cell, and determine the absorbance at the wavelength of maximum absorbance at about 315 nm using the line drawn tangent to the curves appearing as minima in the spectrum in wavelength regions above and below the maximum wavelength as the baseline.

Acceptance criteria: The absorbance, calculated on the basis of a 250-mg specimen, is NLT 0.20 for California-type Lemon Oil or NLT 0.49 for Italian-type Lemon Oil.

• **Foreign Oils:** Place 50 mL of Oil in a four-bulb Ladenburg flask having the following dimensions: the lower or main bulb is about 6 cm in diameter, and the smaller condensing bulbs are about 3.5, 3.0, and 2.5 cm in diameter; the distance from the bottom of the flask to the side-arm is about 20 cm. Distill Oil at a rate of 1 drop/s until the distillate measures 5 mL: the angular rotation of the first 5 mL is NMT 6° less than that of the original Oil. The refractive index at 20° of this same portion is 0.001–0.003 lower than that of the original Oil.

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-filled, tight containers, and avoid exposure to excessive heat.

• **Labeling:** The label states the Latin binomial and, following the official name, the part of the plant source from which the article was derived. Label it to also indicate whether it is California-type or Italian-type Lemon Oil. The label indicates that Oil is not to be used if it has a terebinthine odor.

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
LEMON OIL	Nam-Cheol Kim Scientific Liaison	BDSHM2020 Botanical Dietary Supplements and Herbal Medicines
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