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Loperamide Hydrochloride Oral Solution

DEFINITION

Loperamide Hydrochloride Oral Solution contains NLT 90.0% and NMT 110.0% of the labeled amount of loperamide hydrochloride ($C_{29}H_{33}ClN_2O_2 \cdot HCl$).

IDENTIFICATION

Change to read:

• **A.** ▲**Spectroscopic Identification Tests** ⟨197⟩, *Infrared Spectroscopy*: **197K**▲ (CN 1-May-2020)

Sample: Transfer a volume of Oral Solution containing a suitable amount of loperamide hydrochloride (typically 12–24 mg) to a separator containing about 100 mL of water and 1 mL of 50% sodium hydroxide solution, and gently swirl the contents. Add 50 mL of methylene chloride, shake gently by hand, releasing pressure often, and then shake by mechanical means for 20 min. Allow the layers to separate. Transfer the lower methylene chloride layer to a separator containing 100 mL of water. Shake gently by hand, releasing pressure often, and then shake by mechanical means for 10 min. Allow the layers to separate. Transfer the lower methylene chloride layer to a 250-mL beaker, and evaporate to dryness on a steam bath with the aid of a current of air. Add 10 mL of methanol and 500 mg of potassium bromide to the beaker. Evaporate to dryness on a steam bath with the aid of a current of air, and use the residue.

Acceptance criteria: The spectrum obtained from the *Sample* shows bands at approximately 3400 cm^{-1}, 2929 cm^{-1}, 1624 cm^{-1}, and 1493 cm^{-1}, similar to the spectrum from a Standard similarly obtained.

• **B.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.

ASSAY

• **Procedure**

Buffer: 3.0 g/L of monobasic potassium phosphate in water

Mobile phase: Acetonitrile and *Buffer* (37:63), adjusted with 5% phosphoric acid to a pH of 3.0

Standard stock solution: Prepare 2 mg/mL of USP Loperamide Hydrochloride RS in methanol. Dilute this solution with water to obtain a 0.1-mg/mL solution.

Standard solution: 0.01 mg/mL of USP Loperamide Hydrochloride RS in *Mobile phase* from the *Standard stock solution*

Sample solution: Nominally 0.01 mg/mL of loperamide hydrochloride from Oral Solution, prepared as follows. Transfer a volume of Oral Solution, equivalent to about 1.0 mg of loperamide hydrochloride, to a 100-mL volumetric flask. Dilute with *Mobile phase* to volume, mix, and filter.

Chromatographic system

(See *Chromatography* ⟨621⟩, *System Suitability*.)

Mode: LC

Detector: UV 214 nm

Column: 4.0-mm × 8.0-cm; 5-µm packing L7, 4.6-mm × 7.5-cm; 3.5-µm packing L7, or 4.6-mm × 12.5-cm; 5-µm packing L7

Flow rate: 1.5 mL/min

Injection volume: 10 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of loperamide hydrochloride ($C_{29}H_{33}ClN_2O_2 \cdot HCl$) in the portion of Oral Solution taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak area from the *Sample solution*

r_S = peak area from the *Standard solution*

C_S = concentration of USP Loperamide Hydrochloride RS in the *Standard solution* (mg/mL)

C_U = nominal concentration of loperamide hydrochloride in the *Sample solution* (mg/mL)

Acceptance criteria: 90.0%–110.0%

OTHER COMPONENTS

• **Alcohol Determination,** *Method II* ⟨611⟩ (if present)**:** 90.0%–110.0% of the labeled amount of alcohol (C_2H_5OH)

PERFORMANCE TESTS

• **Uniformity of Dosage Units** ⟨905⟩

For single-unit containers

Acceptance criteria: Meets the requirements

• **Deliverable Volume** ⟨698⟩

For multiple-unit containers

Acceptance criteria: Meets the requirements

SPECIFIC TESTS

• **pH** ⟨791⟩**:** 2.7–6.5

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight, light-resistant containers. Store below 40°, preferably between 15° and 30°, unless otherwise specified by the manufacturer.

• **USP Reference Standards** ⟨11⟩

USP Loperamide Hydrochloride RS

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

Topic/Question	Contact	Expert Committee
LOPERAMIDE HYDROCHLORIDE ORAL SOLUTION	Documentary Standards Support	SM32020 Small Molecules 3

Chromatographic Database Information: Chromatographic Database

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