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Propranolol Hydrochloride Injection

DEFINITION

Propranolol Hydrochloride Injection is a sterile solution of Propranolol Hydrochloride in Water for Injection. It contains NLT 90.0% and NMT 110.0% of the labeled amount of propranolol hydrochloride ($C_{16}H_{21}NO_2 \cdot HCl$).

IDENTIFICATION

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

Add the following:

▲• **B.** The UV spectrum of the major peak of the *Diluted sample solution* corresponds to that of the *Diluted standard solution*, as obtained in the *Assay*.▲ (USP 1-Dec-2022)

ASSAY

Change to read:

• **Procedure**

▲**Mobile phase:** Dissolve 1.6 g of sodium dodecyl sulfate and 0.3 g of tetrabutylammonium phosphate in a mixture consisting of 1 mL of sulfuric acid, 450 mL of water, and 550 mL of acetonitrile. Adjust with 2 N sodium hydroxide solution to a pH of 3.3.

Standard solution: 0.1 mg/mL of USP Propranolol Hydrochloride RS in *Mobile phase*. Sonicate to dissolve, if necessary.

Diluted standard solution: 0.02 mg/mL of USP Propranolol Hydrochloride RS in *Mobile phase* from *Standard solution*

Sample solution: Nominally 0.1 mg/mL of propranolol hydrochloride in *Mobile phase* from a volume of the Injection

Diluted sample solution: Nominally 0.02 mg/mL of propranolol hydrochloride in *Mobile phase* from *Sample solution*

Chromatographic system

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

Mode: LC

Detector: UV 292 nm. For *Identification B*, use a diode array detector in the range of 200–400 nm.

Column: 4.6-mm × 25-cm; 5-µm packing L1

Flow rate: 1.8 mL/min

Injection volume: 50 µL

Run time: NLT 9 times the retention time of propranolol

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 1.0%

Analysis

Samples: *Standard solution*, *Diluted standard solution*, *Sample solution*, and *Diluted sample solution*

[Note—The *Diluted standard solution* and *Diluted sample solution* are used for *Identification B*.]

Calculate the percentage of the labeled amount of propranolol hydrochloride ($C_{16}H_{21}NO_2 \cdot HCl$) in the portion of Injection taken:

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

r_U = peak response of propranolol from the *Sample solution*

r_S = peak response of propranolol from the *Standard solution*

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

C_U = nominal concentration of propranolol hydrochloride in the *Sample solution* (mg/mL)▲ (USP 1-Dec-2022)

Acceptance criteria: 90.0%–110.0%

Add the following:

▲IMPURITIES

• **Organic Impurities**

Mobile phase and **Chromatographic system:** Proceed as directed in the *Assay*.

System suitability solution: 1 µg/mL of USP Propranolol Related Compound A RS and 500 µg/mL of USP Propranolol Hydrochloride RS in *Mobile phase*

Standard solution: 1 µg/mL of USP Propranolol Hydrochloride RS in *Mobile phase*

Sensitivity solution: 0.5 µg/mL of USP Propranolol Hydrochloride RS in *Mobile phase* from *Standard solution*

Sample solution: Nominally 500 µg/mL of propranolol hydrochloride in *Mobile phase* from a volume of the Injection.

System suitability

Samples: *System suitability solution*, *Standard solution*, and *Sensitivity solution*

[Note—The relative retention times for propranolol related compound A and propranolol are 0.6 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 3.0 between propranolol and propranolol related compound A, *System suitability solution*

Relative standard deviation: NMT 5.0%, *Standard solution*

Signal-to-noise ratio: NLT 10, *Sensitivity solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of any unspecified degradation product in the portion of Injection taken:

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

r_U = peak response of any unspecified degradation product from the *Sample solution*

r_S = peak response of propranolol from the *Standard solution*

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

C_U = nominal concentration of propranolol hydrochloride in the *Sample solution* (µg/mL)

Acceptance criteria: See *Table 1*. The reporting threshold is 0.1%.

Table 1

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Any unspecified degradation product	—	0.2
Total degradation products	—	0.5▲ (USP 1-Dec-2022)

SPECIFIC TESTS

Change to read:

• **Bacterial Endotoxins Test ⟨85⟩:** ▲Meets the requirements▲ (USP 1-Dec-2022)

Add the following:

▲• **Particulate Matter in Injections ⟨788⟩:** Meets the requirements▲ (USP 1-Dec-2022)

• **pH ⟨791⟩:** 2.8–4.0

Add the following:

▲• **Sterility Tests ⟨71⟩:** Meets the requirements▲ (USP 1-Dec-2022)

• **Other Requirements:** It meets the requirements in *Injections and Implanted Drug Products ⟨1⟩*.

ADDITIONAL REQUIREMENTS

Change to read:

• **Packaging and Storage:** Preserve in single-dose, light-resistant containers, preferably of Type I glass. ▲Store at controlled room temperature. Protect from freezing or excessive heat.▲ (USP 1-Dec-2022)

Change to read:

• **USP Reference Standards** ⟨11⟩

USP Propranolol Hydrochloride RS

▲ USP Propranolol Related Compound A RS

3-(Naphthalen-1-yloxy)propane-1,2-diol.

$C_{13}H_{14}O_3$ 218.25▲ (USP 1-Dec-2022)

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

Topic/Question	Contact	Expert Committee
PROPRANOLOL HYDROCHLORIDE INJECTION	Documentary Standards Support	SM22020 Small Molecules 2
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM22020 Small Molecules 2

Chromatographic Database Information: Chromatographic Database

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