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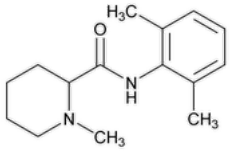
Mepivacaine Hydrochloride



• HCl

$C_{15}H_{22}N_2O \cdot HCl$ 282.81

2-Piperidinecarboxamide, *N*-(2,6-dimethylphenyl)-1-methyl-, monohydrochloride, (±)-;

(±)-1-Methyl-2',6'-pipecoloxylidide monohydrochloride CAS RN®: 1722-62-9; UNII: 4VFX2L7EM5.

DEFINITION

Mepivacaine Hydrochloride contains NLT 98.0% and NMT 102.0% of mepivacaine hydrochloride ($C_{15}H_{22}N_2O \cdot HCl$), calculated on the dried basis.

IDENTIFICATION

Change to read:

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

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

• **C.** Identification Tests—General, *Chloride* ⟨191⟩

Sample solution: 10 mg/mL

Acceptance criteria: Meets the requirements

ASSAY

• **Procedure**

Buffer: 2.25 g/L solution of phosphoric acid, adjusted with 50% sodium hydroxide to a pH of 7.6

Mobile phase: Acetonitrile and *Buffer* (35:65)

System suitability solution: 2 µg/mL of USP Mepivacaine Hydrochloride RS and 3 µg/mL of USP Bupivacaine Related Compound B RS in *Mobile phase*

Standard solution: 0.2 mg/mL of USP Mepivacaine Hydrochloride RS in *Mobile phase*

Sample solution: 0.2 mg/mL of Mepivacaine Hydrochloride in *Mobile phase*

Chromatographic system

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

Mode: LC

Detector: UV 220 nm

Column: 4.6-mm × 15-cm; 5-µm packing L1

Flow rate: 1 mL/min

Injection volume: 20 µL

System suitability

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

Suitability requirements

Resolution: NLT 2.5 between bupivacaine related compound B and mepivacaine, *System suitability solution*

Tailing factor: NMT 1.5, *Standard solution*

Relative standard deviation: NMT 1.0%, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of mepivacaine hydrochloride ($C_{15}H_{22}N_2O \cdot HCl$) in the portion of Mepivacaine Hydrochloride taken:

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

r_U = peak response from the *Sample solution*

r_S = peak response from the *Standard solution*

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

C_U = concentration of Mepivacaine Hydrochloride in the *Sample solution* (mg/mL)

Acceptance criteria: 98.0%–102.0% on the dried basis

IMPURITIES

• **Residue on Ignition ⟨281⟩:** NMT 0.1%

• **Organic Impurities**

Mobile phase, System suitability solution, and **Chromatographic system:** Proceed as directed in the *Assay*. The run time is three times the retention time of the mepivacaine peak.

Standard solution: 2 µg/mL of USP Mepivacaine Hydrochloride RS in *Mobile phase*

Sample solution: 2 mg/mL of Mepivacaine Hydrochloride in *Mobile phase*

System suitability

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

Suitability requirements

Resolution: NLT 2.5 between bupivacaine related compound B and mepivacaine, *System suitability solution*

Tailing factor: NMT 1.5, *Standard solution*

Relative standard deviation: NMT 2.0%, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of any impurity in the portion of Mepivacaine Hydrochloride taken:

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

r_U = peak response of any individual impurity from the *Sample solution*

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

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

C_U = concentration of Mepivacaine Hydrochloride in the *Sample solution* (mg/mL)

Acceptance criteria: See *Table 1*.

Table 1

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Bupivacaine related compound B (desmethyl mepivacaine)[a]	0.4	0.15
Mepivacaine	1.0	—
Picolinamide analog[b]	2.1	0.15
Any individual unspecified impurity	—	0.10
Total impurities	—	0.4

[a] *N*-(2,6-Dimethylphenyl)piperidine-2-carboxamide.

[b] *N*-(2,6-Dimethylphenyl)picolinamide.

• **2,6-Dimethylaniline**

Prepare the *Standard solution* and *Sample solution* fresh, just before use.

Standard stock solution: 0.6 µg/mL of USP Ropivacaine Related Compound A RS in 1 N hydrochloric acid. [Note—Ropivacaine related compound A is 2,6-dimethylaniline hydrochloride.]

Standard solution: Transfer 2.0 mL of the *Standard stock solution* and 1.0 mL of 3 N sodium hydroxide to a 20-mL headspace vial, and immediately close the vial with a cap.

Sample stock solution: 30 mg/mL of Mepivacaine Hydrochloride in 1 N hydrochloric acid

Sample solution: Transfer 2.0 mL of the *Sample stock solution* and 1.0 mL of 3 N sodium hydroxide to a 20-mL headspace vial, and immediately close the vial with a cap.

Chromatographic system

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

Mode: GC

Detector: Flame ionization

Column: 0.53-mm × 30-m capillary; coated with 3-µm film of G43

Temperatures

Injection port: 225°

Detector: 250°

Column: See *Table 2*.

Table 2

Initial Temperature (°)	Temperature Ramp (°/min)	Final Temperature (°)	Hold Time at Final Temperature (min)
130	10	230	5

Carrier gas: Helium

Flow rate: 4 mL/min

Injection type: Split ratio, 1:1

Headspace sampler

Equilibration time: 15 min

Equilibration temperature: 90°

Loop temperature: 215°

Transfer line temperature: 220°

Vial pressure: About 15 psi

Loop size: 3 mL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 15%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the quantity, in ppm, of 2,6-dimethylaniline in the portion of Mepivacaine Hydrochloride taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (M_{r1}/M_{r2}) \times 10^6$$

r_U = peak response of 2,6-dimethylaniline from the *Sample solution*

r_S = peak response of 2,6-dimethylaniline from the *Standard solution*

C_S = concentration of USP Ropivacaine Related Compound A RS in the *Standard solution* (µg/mL)

C_U = concentration of Mepivacaine Hydrochloride in the *Sample solution* (µg/mL)

M_{r1} = molecular weight of 2,6-dimethylaniline, 121.18

M_{r2} = molecular weight of 2,6-dimethylaniline hydrochloride (ropivacaine related compound A), 157.64

Acceptance criteria: NMT 20 ppm

SPECIFIC TESTS

• **Loss on Drying ⟨731⟩**

Analysis: Dry at 105° for 4 h.

Acceptance criteria: NMT 1.0%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers.

Change to read:

• **USP Reference Standards ⟨11⟩**

USP Bupivacaine Related Compound B RS

▲*N*-(2,6-Dimethylphenyl)piperidine-2-carboxamide hydrochloride.
$C_{14}H_{20}N_2O \cdot HCl$ 268.79▲ (ERR 1-Oct-2018)

USP Mepivacaine Hydrochloride RS

USP Ropivacaine Related Compound A RS

2,6-Dimethylaniline hydrochloride.

$C_8H_{11}N \cdot HCl$ 157.64

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

Topic/Question	Contact	Expert Committee
MEPIVACAINE HYDROCHLORIDE	Documentary Standards Support	SM52020 Small Molecules 5

Chromatographic Database Information: Chromatographic Database

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