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Maprotiline Hydrochloride Tablets

DEFINITION

Maprotiline Hydrochloride Tablets contain NLT 90.0% and NMT 110.0% of the labeled amount of maprotiline hydrochloride ($C_{20}H_{23}N \cdot HCl$).

IDENTIFICATION

Delete the following:

▲• **A. Thin-Layer Chromatography**

Standard solution: 20 mg/mL of USP Maprotiline Hydrochloride RS in methanol

Sample solution: Transfer a portion of powdered Tablets, equivalent to 100 mg of maprotiline hydrochloride, to a glass-stoppered centrifuge tube. Add 5.0 mL of methanol to the tube, sonicate for 10 min, shake by mechanical means for 10 min, and centrifuge.

Chromatographic system

(See *Chromatography ⟨621⟩, Thin-Layer Chromatography*.)

Adsorbent: 0.25-mm layer of chromatographic silica gel that has been prewashed with chloroform by allowing chloroform to travel the full length of the plate, and dried at 100° for 30 min

Application volume: 5 µL

Developing solvent system: Secondary butyl alcohol, ethyl acetate, and 2 N ammonium hydroxide (6:3:1)

Analysis

Samples: *Standard solution* and *Sample solution*

In a suitable chromatographic chamber, place a volume of the *Developing solvent system* sufficient to develop a chromatogram. Place a beaker containing 25 mL of ammonium hydroxide in the bottom of the chamber, and allow it to equilibrate for 1 h. Apply *Samples* and allow the spots to dry. Develop the chromatograms until the solvent front has moved three-fourths of the length of the plate, remove the plate from the developing chamber, mark the solvent front, and allow the solvent to evaporate. Expose the plate to hydrogen chloride vapor for 30 min, and expose it to a high-intensity UV light irradiator (1000 to 1600 watts) for 5 min. [**Caution—**UV irradiators emit UV radiation that is harmful to eyes and skin.] Compare the chromatograms under long-wavelength UV light.

Acceptance criteria: The R_F value of the principal spot of the *Sample solution* corresponds to that of the *Standard solution*. ▲2S *(USP41)*

Add the following:

▲• **A.** The UV spectrum of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*. ▲2S *(USP41)*

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

ASSAY

Change to read:

• **Procedure**

▲**Ammonia solution:** 70-g/L ammonium hydroxide solution

Mobile phase: Dissolve 0.6 g of ammonium acetate in 200 mL of water, and then add 2 mL of *Ammonia solution*, 150 mL of 2-propanol, and 650 mL of methanol.

System suitability solution: 1.0 mg/mL of USP Maprotiline Hydrochloride RS and 0.1 mg/mL of USP Maprotiline Related Compound D RS in *Mobile phase*

Standard solution: 1.0 mg/mL of USP Maprotiline Hydrochloride RS in *Mobile phase*

Sample stock solution: Nominally 2.0 mg/mL of maprotiline hydrochloride in *Mobile phase* prepared as follows. Transfer NLT 4 Tablets into a suitable volumetric flask and add 80% of the flask volume of *Mobile phase*. Shake for 10 min and then sonicate with occasional shaking until the Tablets disintegrate. Cool and dilute with *Mobile phase* to volume. Pass a portion of the solution through a suitable filter of 0.45-µm pore size. Discard the first 2 mL of the filtrate.

Sample solution: Nominally 1.0 mg/mL of maprotiline hydrochloride in *Mobile phase* from *Sample stock solution*

Chromatographic system

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

Mode: LC

Detector: UV 272 nm. For *Identification A*, use a diode array detector in the range of 200–400 nm.

Column: 4.6-mm × 25-cm; 5-µm packing L3

Autosampler temperature: 4°

Flow rate: 1 mL/min

Injection volume: 20 µL

Run time: NLT 2.5 times the retention time of maprotiline

System suitability

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

[NOTE—The relative retention times for maprotiline related compound D and maprotiline are 0.9 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 1.8 between the maprotiline related compound D and maprotiline peaks, *System suitability solution*

Tailing factor: NMT 2.0, *Standard solution*

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

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of maprotiline hydrochloride ($C_{20}H_{23}N \cdot HCl$) in the portion of Tablets 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 Maprotiline Hydrochloride RS in the *Standard solution* (mg/mL)

C_U = nominal concentration of maprotiline hydrochloride in the *Sample solution* (mg/mL)▲2S *(USP41)*

Acceptance criteria: 90.0%–110.0%

PERFORMANCE TESTS

Change to read:

• **DISSOLUTION** ⟨711⟩

Medium: Dilute hydrochloric acid (7 in 1000); 900 mL

Apparatus 2: 50 rpm

Time: 60 min

Standard solution: USP Maprotiline Hydrochloride RS in *Medium*

Sample solution: ▲Pass portions of the solution under test through a suitable filter and dilute with *Medium*, if necessary, to a concentration similar to that of the *Standard solution*.▲2S *(USP41)*

Instrumental conditions

Mode: UV

Analytical wavelengths: Minimum absorbance at about 268 nm; maximum absorbance at about 272 nm

Analysis

Samples: *Standard solution* and *Sample solution*

▲Calculate the percentage of the labeled amount of maprotiline hydrochloride ($C_{20}H_{23}N \cdot HCl$) dissolved:

$$\text{Result} = (A_U/A_S) \times C_S \times D \times V \times (1/L) \times 100$$

A_U = absorbance of the *Sample solution*

A_S = absorbance of the *Standard solution*

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

D = dilution factor for the *Sample solution*, if needed

V = volume of *Medium*, 900 mL

L = label claim (mg/Tablet)▲2S *(USP41)*

Tolerances: NLT 75% (Q) of the labeled amount of maprotiline hydrochloride ($C_{20}H_{23}N \cdot HCl$) is dissolved.

• **UNIFORMITY OF DOSAGE UNITS** ⟨905⟩**:** Meet the requirements

IMPURITIES

Add the following:

▲• **ORGANIC IMPURITIES**

Ammonia solution, Mobile phase, System suitability solution, Sample stock solution, and **Sample solution:** Prepare as directed in the *Assay*.

Standard solution: 0.002 mg/mL of USP Maprotiline Hydrochloride RS in *Mobile phase*

Chromatographic system: Proceed as directed in the *Assay*, except for the *Detector*.

Detector: UV 272 nm

System suitability

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

[NOTE—The relative retention times for maprotiline related compound D and maprotiline are 0.9 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 1.8 between the maprotiline related compound D and maprotiline peaks, *System suitability solution*

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

Analysis

Samples: *Sample solution* and *Standard solution*

Calculate the percentage of each individual degradation product in the portion of Tablets taken:

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

r_U = peak response of each individual degradation product from the *Sample solution*

r_S = peak response of maprotiline hydrochloride from the *Standard solution*

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

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

Acceptance criteria: See *Table 1*.

Table 1

Name	Acceptance Criteria, NMT (%)
Any individual degradation product	0.2
Total degradation products	3.0▲2S *(USP41)*

ADDITIONAL REQUIREMENTS

Change to read:

• **PACKAGING AND STORAGE:** Preserve in well-closed containers. ▲Protect from light. Store at controlled room temperature.▲2S *(USP41)*

Change to read:

• **USP REFERENCE STANDARDS** ⟨11⟩

USP Maprotiline Hydrochloride RS

▲ USP Maprotiline Related Compound D RS

3-(9,10-Dihydro-9,10-ethanoanthracen-9-yl)-*N*-methylprop-2-en-1-amine hydrochloride.

$C_{20}H_{21}N \cdot HCl$ 311.85▲2S *(USP41)*

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

Topic/Question	Contact	Expert Committee
MAPROTILINE HYDROCHLORIDE TABLETS	Documentary Standards Support	SM42020 Small Molecules 4

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