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Amantadine Hydrochloride Capsules

DEFINITION

Amantadine Hydrochloride Capsules contain NLT 95.0% and NMT 105.0% of the labeled amount of amantadine hydrochloride ($C_{10}H_{17}N \cdot HCl$).

IDENTIFICATION

Change to read:

- **A.** [▲SPECTROSCOPIC IDENTIFICATION TESTS \(197\), Infrared Spectroscopy](#): 197A, 197K, or 197S▲ (CN 1-May-2020)
Cell: 1 mm
Sample solution: Place the contents of Capsules, equivalent to 200 mg of amantadine hydrochloride, in a vessel, dissolve in [0.1 N hydrochloric acid](#), and filter. Transfer the filtrate to a separator, add 1 mL of 5 N [sodium hydroxide](#), and extract with 5 mL of [methylene chloride](#). Filter the extract through [anhydrous sodium sulfate](#), and rinse the anhydrous sodium sulfate with 2 mL of [methylene chloride](#).
- **B.** The retention time of the amantadine peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the Assay.

ASSAY

• PROCEDURE

- Internal standard solution:** 0.4 mg/mL of [naphthalene](#) in [hexane](#)
- Standard stock solution:** 2 mg/mL of [USP Amantadine Hydrochloride RS](#) in [water](#)
- Standard solution:** Transfer 25.0 mL of *Standard stock solution* into a 250-mL separator, and add 25 mL of [2 N sodium hydroxide](#) and 50.0 mL of *Internal standard solution*. Shake for about 10 min, and collect the hexane layer.
- Sample stock solution:** Transfer NLT 20 Capsules to a 200-mL volumetric flask. Add 40 mL of [0.1 N hydrochloric acid](#) and 40 mL of water. Sonicate for 20 min with intermittent shaking, and dilute with [water](#) to volume. Centrifuge the solution for 10 min and pass through a suitable filter.
- Sample solution:** Transfer 5.0 mL of the filtrate into a 250-mL separator, and add 40.0 mL of [1 N sodium hydroxide](#) and 50.0 mL of *Internal standard solution*. Shake for about 10 min, and collect the hexane layer.

Chromatographic system

(See [Chromatography \(621\), System Suitability](#).)

- Mode:** GC
- Detector:** Flame ionization
- Column:** 0.32-mm × 30-m; coated with a 0.25-μm film of phase [G1](#)
- Temperatures**
- Injection port:** 250°
- Detector:** 300°
- Column:** See [Table 1](#).

Table 1

Initial Temperature (°)	Temperature Ramp (°/min)	Final Temperature (°)	Hold Time at Final Temperature (min)
100	0	100	3
100	10	200	2

- Carrier gas:** Helium
- Flow rate:** 1.4 mL/min
- Injection volume:** 2 μL
- Injection type:** Split
- Split flow rate:** 20 mL/min
- System suitability**
- Sample:** *Standard solution*

[NOTE—The relative retention times for naphthalene and amantadine are 0.90 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 2.0 between naphthalene and amantadine

Tailing factor: NMT 2.0 for the amantadine peak

Relative standard deviation: NMT 2.0% for the peak response ratio of amantadine to naphthalene

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of amantadine hydrochloride ($C_{10}H_{17}N \cdot HCl$) in the portion of Capsules taken:

$$\text{Result} = (R_U/R_S) \times (C_S/C_U) \times 100$$

R_U = peak response ratio of amantadine to naphthalene from the *Sample solution*

R_S = peak response ratio of amantadine to naphthalene from the *Standard solution*

C_S = concentration of [USP Amantadine Hydrochloride RS](#) in the *Standard solution* (mg/mL)

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

Acceptance criteria: 95.0%–105.0%

PERFORMANCE TESTS

• [DISSOLUTION \(711\)](#)

Test 1

Medium: Water; 900 mL

Apparatus 1: 100 rpm

Time: 45 min

Internal standard solution: 0.054 mg/mL of [naphthalene](#) in [hexane](#)

Standard stock solution: 0.1 mg/mL of [USP Amantadine Hydrochloride RS](#) in [water](#)

Standard solution: Transfer 15.0 mL of *Standard stock solution* into a 50-mL screw-capped test tube, add 5.0 mL of 5 N [sodium hydroxide](#) and 10.0 mL of *Internal standard solution*, and shake for 60 min. Collect the hexane layer.

Sample solution: Transfer 15.0 mL of the filtered solution under test, and place into a 50-mL screw-capped test tube. Pipet 5.0 mL of 5 N [sodium hydroxide](#) and 10.0 mL of the *Internal standard solution* into the test tube, and shake for 60 min. Collect the hexane layer.

Chromatographic system

(See [Chromatography \(621\)](#), [System Suitability](#).)

Mode: GC

Detector: Flame ionization

Column: 0.32-mm × 30-m; coated with a 0.25-μm film of phase [G1](#)

Temperatures

Injection port: 250°

Detector: 300°

Column: See [Table 2](#).

Table 2

Initial Temperature (°)	Temperature Ramp (°/min)	Final Temperature (°)	Hold Time at Final Temperature (min)
100	0	100	3
100	10	200	2

Carrier gas: Helium

Flow rate: 1.4 mL/min

Injection volume: 2 μL

Injection type: Split

Split flow rate: 20 mL/min

System suitability

Sample: *Standard solution*

[NOTE—The relative retention times for naphthalene and amantadine are 0.90 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 2.0 between naphthalene and amantadine