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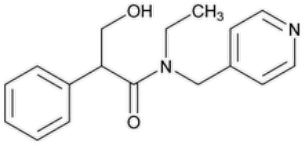
Tropicamide



$C_{17}H_{20}N_2O_2$ 284.35

Benzeneacetamide, *N*-ethyl-α-(hydroxymethyl)-*N*-(4-pyridinylmethyl)-, (±)-;

N-Ethyl-3-hydroxy-2-phenyl-*N*-(pyridin-4- ylmethyl)propanamide CAS RN®: 1508-75-4; UNII: N0A3Z5XTC6.

DEFINITION

Tropicamide contains NLT 98.0% and NMT 102.0% of tropicamide ($C_{17}H_{20}N_2O_2$), 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.*

ASSAY

• **Procedure**

Buffer: Dissolve 0.135 g of sodium dodecyl sulfate and 3.4 mL of phosphoric acid in 950 mL of water. Adjust with 10 M sodium hydroxide to a pH of 3.0, and dilute with water to 1000 mL.

Mobile phase: Acetonitrile and *Buffer* (27:73)

Standard solution: 0.15 mg/mL of USP Tropicamide RS prepared as follows. Transfer USP Tropicamide RS into a suitable volumetric flask, and add acetonitrile equivalent to 6% of the final volume to dissolve. Dilute with water to volume.

Sample solution: 0.15 mg/mL of Tropicamide prepared as follows. Transfer Tropicamide into a suitable volumetric flask, and add acetonitrile equivalent to 6% of the final volume to dissolve. Dilute with water to volume.

Chromatographic system

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

Mode: LC

Detector: 210 nm

Column: 4.6-mm × 15-cm; 3-µm packing L1

Column temperature: 40°

Flow rate: 0.8 mL/min

Injection volume: 15 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 0.73%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of tropicamide ($C_{17}H_{20}N_2O_2$) in the portion of Tropicamide taken:

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

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

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

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

C_U = concentration of Tropicamide 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**

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

System suitability stock solution 1: 100 µg/mL each of USP Tropicamide Related Compound A RS, USP Tropicamide Related Compound C RS, and USP Tropicamide Related Compound D RS prepared as follows. Transfer USP Tropicamide Related Compound A RS, USP Tropicamide Related Compound C RS, and USP Tropicamide Related Compound D RS into a suitable volumetric flask, and add acetonitrile equivalent to 4% of the final volume to dissolve. Dilute with water to volume.

System suitability stock solution 2: 10 µg/mL each of USP Tropicamide Related Compound A RS, USP Tropicamide Related Compound C RS, and USP Tropicamide Related Compound D RS prepared as follows. Dilute 1 mL of *System suitability stock solution 1* with water to 10 mL.

System suitability stock solution 3: 0.5 mg/mL of USP Tropicamide RS and 20 µg/mL of USP Tropicamide Related Compound B RS prepared as follows. Transfer USP Tropicamide RS and USP Tropicamide Related Compound B RS into a suitable volumetric flask, and add acetonitrile equivalent to 10% of the final volume to dissolve. Dilute with water to volume.

System suitability solution: Mix 1 mL each of *System suitability stock solution 2* and *System suitability stock solution 3*.

Standard stock solution: 1 mg/mL of USP Tropicamide RS prepared as follows. Transfer USP Tropicamide RS into a suitable volumetric flask, and add acetonitrile equivalent to 6% of the final volume to dissolve. Dilute with water to volume.

Standard solution 1: 1 µg/mL of USP Tropicamide RS in water from *Standard stock solution*

Standard solution 2: 1.5 µg/mL each of USP Tropicamide Related Compound C RS and USP Tropicamide Related Compound D RS in water from *System suitability stock solution 1*

Sample solution: 1 mg/mL of Tropicamide prepared as follows. Transfer 50 mg of Tropicamide into a 50-mL volumetric flask, and add 3 mL of acetonitrile to dissolve. Dilute with water to volume.

Chromatographic system

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

Mode: LC

Detector: 210 and 254 nm

Column: 4.6-mm × 15-cm; 3-µm packing L1

Column temperature: 40°

Flow rate: 0.8 mL/min

Injection volume: 15 µL

Run time: NLT 3 times the retention time of the tropicamide peak

System suitability

Sample: *System suitability solution*

Suitability requirements

Resolution at 210 nm: NLT 2 between the tropicamide related compounds C and A peaks; NLT 2 between the tropicamide related compounds A and D peaks

Analysis

Samples: *Standard solution 1*, *Standard solution 2*, and *Sample solution*

Calculate the percentage of tropicamide related compound C and tropicamide related compound D in the portion of Tropicamide taken:

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

r_U = peak response of relevant tropicamide related compound from the *Sample solution* at 210 nm

r_S = peak response of relevant tropicamide related compound from *Standard solution 2* at 210 nm

C_S = concentration of relevant tropicamide related compound in *Standard solution 2* (mg/mL)

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

Calculate the percentage of other individual impurities in the portion of Tropicamide taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (1/F) \times 100$$

r_U = peak response of each impurity from the *Sample solution* at 254 nm

r_S = peak response of USP Tropicamide RS from *Standard solution 1* at 254 nm

C_S = concentration of USP Tropicamide RS in *Standard solution 1* (mg/mL)

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

F = relative response factor for each individual impurity (see *Table 1*)

Acceptance criteria: See *Table 1*. Disregard any impurity peaks less than 0.05% at 254 nm.

Table 1

Name	Relative Retention Time	Relative Response Factor	Detection Wavelength (nm)	Acceptance Criteria, NMT (%)
Tropicamide related compound C	0.4	—	210	0.15
Tropicamide related compound A	0.5	1.3	254	0.15
Tropicamide related compound D	0.8	—	210	0.15
Tropicamide	1.0	—	—	—
Tropicamide related compound B	2.3	1.7	254	0.3
Any individual unspecified impurity	—	1.0	254	0.10
Total impurities[a]	—	—	254	0.5

[a] Excluding tropicamide related compound C and tropicamide related compound D.

SPECIFIC TESTS

- **Loss on Drying ⟨731⟩**

Sample: 500 mg

Analysis: Dry the *Sample* under vacuum over phosphorus pentoxide at 80° for 4 h.

Acceptance criteria: NMT 0.5%

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in tight, light-resistant containers.
- **USP Reference Standards ⟨11⟩**

USP Tropicamide RS

USP Tropicamide Related Compound A RS
N-(Pyridin-4-ylmethyl)ethanamine.
$C_8H_{12}N_2$ 136.19

USP Tropicamide Related Compound B RS
N-Ethyl-2-phenyl-*N*-(pyridin-4-ylmethyl)acrylamide.
$C_{17}H_{18}N_2O$ 266.34

USP Tropicamide Related Compound C RS
3-Hydroxy-2-phenylpropionic acid.
$C_9H_{10}O_3$ 166.17

USP Tropicamide Related Compound D RS
2-Phenylacetic acid.
$C_8H_8O_2$ 136.15

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

Topic/Question	Contact	Expert Committee
TROPICAMIDE	Documentary Standards Support	SM32020 Small Molecules 3
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM32020 Small Molecules 3

Chromatographic Database Information: Chromatographic Database

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