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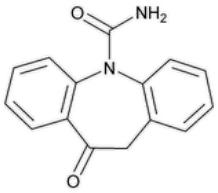
Oxcarbazepine



$C_{15}H_{12}N_2O_2$ 252.27

5*H*-Dibenz[*b*,*f*]azepine-5-carboxamide, 10,11-dihydro-10-oxo-;

10,11-Dihydro-10-oxo-5*H*-dibenz[*b*,*f*]azepine-5-carboxamide CAS RN®: 28721-07-5; UNII: VZI5B1W380.

DEFINITION

Oxcarbazepine contains NLT 98.0% and NMT 102.0% of oxcarbazepine ($C_{15}H_{12}N_2O_2$), calculated on the anhydrous basis.

IDENTIFICATION

Change to read:

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

[Note—If the spectrum obtained shows differences, dissolve the substance to be examined in chloroform, and evaporate to dryness. Compare the spectrum of the residue to that of a similarly prepared USP Oxcarbazepine RS.]

• **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: 6.8 g/L of monobasic potassium phosphate in water. For each liter prepared, add 2 mL of triethylamine, and mix. Adjust with phosphoric acid to a pH of 6.0 ± 0.1.

Mobile phase: Methanol, acetonitrile, and *Buffer* (11:8:31)

Standard solution: 0.1 mg/mL of USP Oxcarbazepine RS in *Mobile phase*

Sample solution: 0.1 mg/mL of Oxcarbazepine in *Mobile phase*

Chromatographic system

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

Mode: LC

Detector: UV 215 nm

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

Column temperature: 50°

Flow rate: 1.5 mL/min

Injection volume: 10 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of oxcarbazepine ($C_{15}H_{12}N_2O_2$) in the portion of Oxcarbazepine 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 Oxcarbazepine RS in the *Standard solution* (mg/mL)

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

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

IMPURITIES

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

• **Organic Impurities, Procedure 1**

[Note—If oxcarbazepine related compound A and oxcarbazepine related compound B are known process impurities, *Organic Impurities, Procedure 2* is recommended.]

Mobile phase: Prepare as directed in the *Assay*.

System suitability solution: 0.1 mg/mL each of USP Oxcarbazepine RS and USP Carbamazepine RS in *Mobile phase*

Standard solution: 0.25 µg/mL of USP Oxcarbazepine RS in *Mobile phase*

Sample solution: 0.5 mg/mL of Oxcarbazepine in *Mobile phase*

Chromatographic system: Proceed as directed in the *Assay*, except to use a run time 10 times the retention time of oxcarbazepine.

System suitability

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

Suitability requirements

Resolution: NLT 8.0 between oxcarbazepine and carbamazepine, *System suitability solution*

Relative standard deviation: NMT 10.0%, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of each impurity in the portion of Oxcarbazepine 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*

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

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

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

F = relative response factor (see *Table 1*)

Acceptance criteria: See *Table 1*.

Table 1

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Oxcarbazepine	1.0	1.0	—
Carbamazepine[a]	1.7	1.9	0.5
Oxcarbazepine related compound E	2.1	1.2	0.05
Methoxycarbamazepine[b]	2.5	1.6	0.05
Carbamazepine related compound B[c]	7.4	1.3	0.05

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Methoxydibenzazepine[d]	7.9	1.5	0.05
Any individual unspecified impurity	—	1.0	0.05
Total impurities	—	—	1.0

[a] 5*H*-Dibenz[*b*,*f*]azepine-5-carboxamide.

[b] 10-Methoxy-5*H*-Dibenz[*b*,*f*]azepine-5-carboxamide.

[c] 5*H*-Dibenz[*b*,*f*]azepine.

[d] 10-Methoxy-5*H*-Dibenz[*b*,*f*]azepine.

- **Organic Impurities, Procedure 2**

Buffer A: 0.004 mol/L of monobasic potassium phosphate and 0.063 mol/L of dibasic sodium phosphate

Buffer B: To 1 L of 3.6 g/L edetate disodium in water add 1 L of *Buffer A*.

Diluent: 1.8 g/L of ascorbic acid in water

Solution A: Acetonitrile, tetrahydrofuran, *Buffer B*, and water (1:2:2:15)

Solution B: Acetonitrile, tetrahydrofuran, *Buffer B*, and water (6:1:1:2)

Mobile phase: See *Table 2*.

Table 2

Time (min)	Solution A (%)	Solution B (%)
0	80	20
1	80	20
29	30	70
30	30	70
33	80	20
42	80	20

System suitability solution: 2 µg/mL each of USP Oxcarbazepine Related Compound A RS, USP Oxcarbazepine Related Compound B RS, USP Oxcarbazepine Related Compound D RS, and USP Oxcarbazepine Related Compound E RS in a 1:1 mixture of acetonitrile and *Diluent*

Standard stock solution: 0.1 mg/mL of USP Oxcarbazepine RS in acetonitrile

Standard solution: 2 µg/mL of USP Oxcarbazepine RS in a 1:1 mixture of acetonitrile and *Diluent*

Sample solution: 1.0 mg/mL of Oxcarbazepine in a 1:1 mixture of acetonitrile and *Diluent*

Chromatographic system

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

Mode: LC

Detector: UV 240 nm

Column: 4.6-mm × 25-cm; 3-µm packing L1

Column temperature: 50°

Flow rate: 0.8 mL/min

Injection volume: 50 µL

System suitability

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

Suitability requirements

Resolution: NLT 1.0 between oxcarbazepine related compound A and oxcarbazepine related compound B; NLT 1.2 between oxcarbazepine related compound D and oxcarbazepine related compound E, *System suitability solution*

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

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of each impurity in the portion of Oxcarbazepine 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*

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

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

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

F = relative response factor (see *Table 3*)

Acceptance criteria: See *Table 3*. [NOTE—Disregard any peak below 0.03%.]

Table 3

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Oxcarbazepine related compound F[a]	0.76	0.59	0.2
Oxcarbazepine	1.0	—	—
N-Carbamoyl oxcarbazepine[b]	1.1	0.91	0.05
Oxcarbazepine related compound A[c]	1.2	1.1	0.2
Oxcarbazepine related compound B[d]	1.3	1.1	0.1
Dibenzazepinodione[e]	1.7	2.0	0.1
Oxcarbazepine related compound D[f]	2.3	1.7	0.2
Oxcarbazepine related compound E	2.4	3.3	0.05
Any individual unspecified impurity	—	1.0	0.05
Total impurities	—	—	1.0

[a] 10,11-Dioxo-10,11-dihydro-5*H*-dibenzo[*b,f*]azepine-5-carboxamide.

[b] *N*-Carbamoyl-10-oxo-10,11-dihydro-5*H*-dibenzo[*b,f*]azepine-5-carboxamide.

[c] *N*-Formyl-10-oxo-10,11-dihydro-5*H*-dibenzo[*b,f*]azepine-5-carboxamide.

[d] *N*-Acetyl-10-oxo-10,11-dihydro-5*H*-dibenzo[*b,f*]azepine-5-carboxamide.

[e] 5*H*-Dibenzo[*b,f*]azepine-10,11-dione.

[f] 10-(10-Oxo-10,11-dihydro-5*H*-dibenzo[*b*,*f*]azepine-5-carboxamido)-5*H*-dibenzo[*b*,*f*]azepine-5-carboxamide.

SPECIFIC TESTS

• **Water Determination,** *Method Ia* ⟨921⟩**:** NMT 0.5%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers. Store at controlled room temperature.

• **Labeling:** If a test for *Organic Impurities* other than *Procedure 1* is used, the labeling states the test with which the article complies.

• **USP Reference Standards** ⟨11⟩

USP Oxcarbazepine RS

USP Carbamazepine RS

USP Oxcarbazepine Related Compound A RS

N-Formyl-10-oxo-10,11-dihydro-5*H*-dibenzo[*b*,*f*]azepine-5-carboxamide.

$C_{16}H_{12}N_2O_3$ 280.28

USP Oxcarbazepine Related Compound B RS

N-Acetyl-10-oxo-10,11-dihydro-5*H*-dibenzo[*b*,*f*]azepine-5-carboxamide.

$C_{17}H_{14}N_2O_3$ 294.30

USP Oxcarbazepine Related Compound D RS

10-(10-Oxo-10,11-dihydro-5*H*-dibenzo[*b*,*f*]azepine-5-carboxamido)-5*H*-dibenzo[*b*,*f*]azepine-5-carboxamide.

$C_{30}H_{22}N_4O_3$ 486.52

USP Oxcarbazepine Related Compound E RS

10(11*H*)-Oxo-5*H*-Dibenz[*b*,*f*]azepine.

$C_{14}H_{11}NO$ 209.24

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

Topic/Question	Contact	Expert Committee
OXCARBAZEPINE	Documentary Standards Support	SM42020 Small Molecules 4
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM42020 Small Molecules 4

Chromatographic Database Information: Chromatographic Database

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