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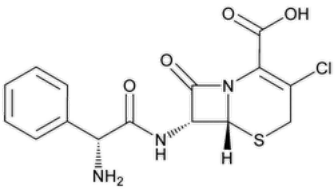
Cefaclor



• H_2O

$C_{15}H_{14}ClN_3O_4S \cdot H_2O$ 385.82

5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[(aminophenylacetyl)amino]-3-chloro-8-oxo-, monohydrate, [6*R*-[6α,-7β(*R**)]]-; (6*R*,7*R*)-7-[(*R*)-2-Amino-2-phenylacetamido]-3-chloro-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid monohydrate;

3-Chloro-7-D-(2-phenylglycinamido)-3-cephem-4-carboxylic acid monohydrate CAS RN®: 70356-03-5; UNII: 69K7K19H4L.

Anhydrous 367.80 CAS RN®: 53994-73-3; UNII: 3Z6FS3IK0K.

DEFINITION

Cefaclor has a potency of NLT 950 µg/mg and NMT 1020 µg/mg of cefaclor ($C_{15}H_{14}ClN_3O_4S$), calculated on the anhydrous 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**

Mobile phase: Dissolve 1 g of sodium 1-pentanesulfonate in a mixture of 780 mL of water and 10 mL of triethylamine. Adjust with phosphoric acid to a pH of 2.5 ± 0.1, and add 220 mL of methanol.

System suitability solution: 0.3 mg/mL of USP Cefaclor RS and 0.3 mg/mL of USP Cefaclor Delta-3 Isomer RS in *Mobile phase*

Standard solution: 0.3 mg/mL of USP Cefaclor RS in *Mobile phase*. Sonicate briefly, if necessary, to achieve dissolution, and avoid heating the solution. Use within 8 h if stored at room temperature or within 20 h if stored at 5°.

Sample solution: 0.3 mg/mL of Cefaclor in *Mobile phase*. Sonicate briefly, if necessary, to achieve dissolution, and avoid heating the solution. Use within 8 h if stored at room temperature or within 20 h if stored at 5°.

Chromatographic system

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

Mode: LC

Detector: UV 265 nm

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

Flow rate: 1.5 mL/min

Injection volume: 20 µL

System suitability

Sample: *System suitability solution*

[Note—The relative retention times for cefaclor and cefaclor delta-3 isomer are about 1.0 and 1.35, respectively.]

Suitability requirements

Resolution: NLT 2.5 between the cefaclor peak and the cefaclor delta-3 isomer peak

Tailing factor: NMT 1.5 for the cefaclor peak

Relative standard deviation: NMT 0.73% for the cefaclor peak

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the potency, in µg/mg, of cefaclor ($C_{15}H_{14}ClN_3O_4S$) in the portion of Cefaclor taken:

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

r_U = peak area from the *Sample solution*

r_S = peak area from the *Standard solution*

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

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

P = designated potency of USP Cefaclor RS (µg/mg)

Acceptance criteria: 950–1020 µg/mg on the anhydrous basis

IMPURITIES

• **Organic Impurities**

Diluent: 2.4 g/L of monobasic sodium phosphate in water, adjusted with phosphoric acid to a pH of 2.5

Solution A: 6.9 g/L of monobasic sodium phosphate in water; adjusted with phosphoric acid to a pH of 4.0

Solution B: Acetonitrile and *Solution A* (45:55), degassing for NMT 2 min

Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	95	5
30	75	25
45	0	100
55	0	100
60	95	5
70	95	5

Standard solution: 0.05 mg/mL of USP Cefaclor RS in *Diluent*. Sonicate briefly, if necessary, to dissolve, and avoid heating. Use within 18 h if stored at room temperature, or within 24 h when stored at 5°.

System suitability solution: 0.05 mg/mL of USP Cefaclor RS and 0.05 mg/mL of USP Cefaclor Delta-3 Isomer RS in *Diluent*

Sample solution: 5 mg/mL of Cefaclor in *Diluent*. Sonicate briefly, if necessary, to dissolve, and avoid heating. Use within 2 h when stored at room temperature or within 20 h when stored at 5°.

Chromatographic system

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

Mode: LC

Detector: UV 220 nm

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

Flow rate: 1 mL/min

Injection volume: 20 µL

System suitability

Sample: *System suitability solution*

[Note—The relative retention times for cefaclor and cefaclor delta-3 isomer are 1.0 and 0.85, respectively.]

Suitability requirements

Resolution: NLT 2.0 between cefaclor delta-3 isomer and cefaclor

Tailing factor: NMT 1.2 for the cefaclor peak

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of each cefaclor related compound in the portion of Cefaclor taken:

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

r_U = peak response of an individual related compound from the *Sample solution*

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

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

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

P = designated potency of USP Cefaclor RS (µg/mg)

F = conversion factor, 0.001 mg/µg

Acceptance criteria

Individual impurities: NMT 0.5% of any individual cefaclor related compound

Total impurities: NMT 2.0% of total cefaclor related compounds

In an acceptable determination, the difference between duplicate determinations of total cefaclor related compounds is NMT 0.2% absolute, or the variation from the mean of the two values is NMT 10%, whichever is greater.

SPECIFIC TESTS

- **Crystallinity ⟨695⟩:** Meets the requirements
- **pH ⟨791⟩**

Sample: 25-mg/mL aqueous suspension

Acceptance criteria: 3.0–4.5

- **Water Determination ⟨921⟩, *Method I*:** 3.0%–6.5%

ADDITIONAL REQUIREMENTS

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

USP Cefaclor RS

USP Cefaclor Delta-3 Isomer RS

(6*R*,7*R*)-7-{[(2*R*)-(Aminophenylacetyl)]amino}-3-chloro-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-3-ene-2-carboxylic acid.

$C_{15}H_{14}ClN_3O_4S$ 367.80

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

Topic/Question	Contact	Expert Committee
CEFACLOR	Documentary Standards Support	SM12020 Small Molecules 1

Chromatographic Database Information: Chromatographic Database

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