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Cefazolin for Injection

DEFINITION

Cefazolin for Injection contains an amount of Cefazolin Sodium equivalent to NLT 90.0% and NMT 115.0% of the labeled amount of ($C_{14}H_{14}N_8O_4S_3$).

IDENTIFICATION

- **A. Spectroscopic Identification Tests ⟨197⟩, *Ultraviolet-Visible Spectroscopy*: 197U**

  Sample solution: 20 µg/mL in 0.1 M sodium bicarbonate

  Acceptance criteria: Meets the requirements
- **B.** The retention time of the major peak from the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.
- **C. Identification Tests—General, *Sodium*⟨191⟩:** Meets the requirements

ASSAY

- **Procedure**

  Buffer A: 0.9 g/L of anhydrous dibasic sodium phosphate and 1.298 g/L of citric acid monohydrate in water. The pH of *Buffer A* is 3.6.

  Buffer B: 5.68 g/L of anhydrous dibasic sodium phosphate and 3.63 g/L of monobasic potassium phosphate in water. The pH of *Buffer B* is 7.0.

  Mobile phase: Acetonitrile and *Buffer A* (10:90). Pass through a membrane filter having a 10-µm or finer pore size.

  Internal standard solution: 7.5 mg/mL of salicylic acid in methanol and *Buffer B* (10:90) prepared as follows. Transfer a suitable portion of salicylic acid to a suitable volumetric flask, dissolve first in methanol using 10% of the final volume, dilute with *Buffer B* to volume, and mix.

  Standard stock solution: 1 mg/mL of USP Cefazolin RS in *Buffer B*

  Standard solution: Transfer 5.0 mL of the *Standard stock solution* to a 100-mL volumetric flask, add 5.0 mL of *Internal standard solution*, dilute with *Buffer B* to volume, and mix.

  Sample stock solution 1 (where it is packaged for dispensing and is represented as being in a single-dose container)**:** Nominally 1 mg/mL of cefazolin from Cefazolin for Injection prepared as follows. Constitute Cefazolin for Injection in a volume of water corresponding to the volume of solvent specified in the labeling. Withdraw all of the withdrawable contents, using a suitable hypodermic needle and syringe, and dilute with *Buffer B*.

  Sample solution 1: Transfer 5.0 mL of the *Sample stock solution 1* to a 100-mL volumetric flask, add 5.0 mL of *Internal standard solution*, dilute with *Buffer B* to volume, and mix.

  Sample stock solution 2 (where the label states the quantity of cefazolin in a given volume of constituted solution)**:** Nominally 1 mg/mL of cefazolin from Cefazolin for Injection prepared as follows. Constitute Cefazolin for Injection in a volume of water corresponding to the volume of solvent specified in the labeling. Dilute an aliquot of the constituted solution with *Buffer B*.

  Sample solution 2: Transfer 5.0 mL of the *Sample stock solution 2* to a 100-mL volumetric flask, add 5.0 mL of *Internal standard solution*, dilute with *Buffer B* to volume, and mix.

  Chromatographic system

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

  Mode: LC

  Detector: UV 254 nm

  Column: 4.0-mm × 30-cm; 10-µm packing L1

  Flow rate: 2 mL/min

  Injection volume: 10 µL

  System suitability

  Sample: *Standard solution*

  [Note—The relative retention times for salicylic acid and cefazolin are about 0.7 and 1.0, respectively.]

  Suitability requirements

  Resolution: NLT 4.0 between the analyte and internal standard peaks

  Column efficiency: NLT 1500 theoretical plates

  Tailing factor: NMT 1.5

  Relative standard deviation: NMT 2.0%

  Analysis

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

Calculate the percentage of the labeled amount of cefazolin ($C_{14}H_{14}N_8O_4S_3$) in the container and in the volume of constituted solution taken:

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

R_U = peak response ratio of cefazolin to the internal standard of the *Sample solution*

R_S = peak response ratio of cefazolin to the internal standard of the *Standard solution*

C_S = concentration of USP Cefazolin RS, calculated on the anhydrous basis, in the *Standard solution* (mg/mL)

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

P = potency of cefazolin in USP Cefazolin RS (mg/mg)

Acceptance criteria: 90.0%–115.0%. Where the test for *Uniformity of Dosage Units* ⟨905⟩ has been performed using the *Analysis* for content uniformity, use the average of these determinations as the *Assay* value.

PERFORMANCE TESTS

Change to read:

• **Uniformity of Dosage Units** ⟨905⟩**:** ▲Meets the requirements▲ (CN 1-Aug-2023)

Procedure for content uniformity

Perform the *Assay* on individual containers using *Sample solution 1* or *Sample solution 2*, or both, as appropriate.

▲▲ (CN 1-Aug-2023)

SPECIFIC TESTS

• **Constituted Solution:** At the time of use, it meets the requirements for *Injections and Implanted Drug Products* ⟨1⟩*, Specific Tests, Completeness and clarity of solutions*.

• **Optical Rotation,** *Specific Rotation*⟨781S⟩

Sample solution: 55 mg/mL in 0.1 M sodium bicarbonate

Acceptance criteria: −10° to −24°

• **Bacterial Endotoxins Test** ⟨85⟩**:** NMT 0.15 USP Endotoxin Unit/mg of cefazolin

• **Sterility Tests** ⟨71⟩**:** It meets the requirements when tested as directed in *Test for Sterility of the Product to Be Examined, Membrane Filtration*.

• **pH** ⟨791⟩

Sample solution: 100 mg/mL of cefazolin

Acceptance criteria: 4.0–6.0

• **Water Determination,** *Method I*⟨921⟩**:** NMT 6.0%

• **Particulate Matter in Injection** ⟨788⟩**:** Meets the requirements for small-volume injections

• **Other Requirements:** Meets the requirements in *Labeling* ⟨7⟩*, Labels and Labeling for Injectable Products*

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve as described in *Packaging and Storage Requirements* ⟨659⟩*, Injection Packaging*.

• **USP Reference Standards** ⟨11⟩

USP Cefazolin RS

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

Topic/Question	Contact	Expert Committee
CEFAZOLIN FOR INJECTION	Documentary Standards Support	SM12020 Small Molecules 1

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. Information currently unavailable

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