

Status: Currently Official on 14-Feb-2025

Official Date: Official as of 01-Oct-2022

Document Type: USP Monographs

DocId: GUID-B114E44C-4CA5-463C-9E03-95BD032EBFFA_6_en-US

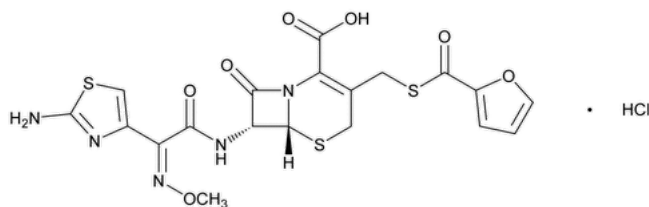
DOI: https://doi.org/10.31003/USPNF_M14133_06_01

DOI Ref: ah2zw

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Ceftiofur Hydrochloride


 $C_{19}H_{17}N_5O_7S_3 \cdot HCl$ 560.02

5-Thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7-[[[(2-amino-4-thiazolyl)(methoxyimino)acetyl]amino]-3-[[[(2-furanylcarbonyl)thio]methyl]-8-oxo-, monohydrochloride, [6R-[6 α ,7 β (Z)]]-;

(6R,7R)-7-[2-(2-Amino-4-thiazolyl)glyoxylamido]-3-(mercaptomethyl)-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid, 7²-(Z)-(O-methyloxime), 2-furoate (ester), monohydrochloride CAS RN®: 103980-44-5.

DEFINITION

Ceftiofur Hydrochloride contains NLT 844 µg/mg and NMT 956 µg/mg of ceftiofur ($C_{19}H_{17}N_5O_7S_3$), calculated on the anhydrous and solvent-free basis.

IDENTIFICATION

- A. SPECTROSCOPIC IDENTIFICATION TESTS (197), Infrared Spectroscopy:** 197M
- 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

Change to read:

PROCEDURE

Solution A: Tetrabutylammonium hydroxide, 40% in water

Solution B: Dissolve 3.85 g of ammonium acetate and 13.5 mL of *Solution A* in 700 mL of water. Adjust with glacial acetic acid to a pH of 6.7.

Mobile phase: Mix 700 mL of *Solution B* with 200 mL of methanol and 110 mL of tetrahydrofuran.

Diluent: 0.05 M ammonium acetate

Standard solution: 0.16 mg/mL of [USP Ceftiofur Hydrochloride RS](#) prepared as follows. Dissolve [USP Ceftiofur Hydrochloride RS](#) in methanol using about 4% of the final volume and dilute with *Diluent* to volume.

Sample solution: 0.16 mg/mL of Ceftiofur Hydrochloride prepared as follows. Dissolve Ceftiofur Hydrochloride in methanol using about 4% of the final volume and dilute with *Diluent* to volume.

Chromatographic system

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

Mode: LC

Detector: UV 254 nm

Column: 4.6-mm × 25-cm; 5-µm packing L7

Column temperature: 40°

Flow rate: 1.5 mL/min

Injection volume: 20 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the Δ quantity, in µg/mg, Δ (ERR 1-Oct-2022) of ceftiofur ($C_{19}H_{17}N_5O_7S_3$) in the portion of Ceftiofur Hydrochloride taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times P \Delta \quad (\text{ERR 1-Oct-2022})$$

r_U = peak response from the *Sample solution*

r_s = peak response from the *Standard solution*

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

C_u = concentration of Ceftiofur Hydrochloride in the *Sample solution* (mg/mL)

P = potency of ceftiofur in [USP Ceftiofur Hydrochloride RS](#) (µg/mg)

Acceptance criteria: 844–956 µg/mg on the anhydrous and solvent-free basis

IMPURITIES

• Low Molecular Weight Impurities

Solution A: Acetonitrile, trifluoroacetic acid, and water (50:1:950)

Solution B: Acetonitrile, trifluoroacetic acid, and water (800:1:200)

Mobile phase: See [Table 1](#).

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	100	0
5	100	0
35	60	40
50	0	100
55	0	100
60	100	0
75	100	0

Diluent: Acetonitrile and water (1:1)

System suitability solution: 0.1 mg/mL of [USP Ceftiofur System Suitability Mixture RS](#) in *Diluent*. Sonicate as needed to dissolve. Inject within 20 min of preparation.

Peak identification solution: 15 µg/mL of [USP Cefotaxime Sodium RS](#) in *Diluent*

Sample stock solution: 3 mg/mL of Ceftiofur Hydrochloride in *Diluent*

Sample solution: 0.3 mg/mL of Ceftiofur Hydrochloride from *Sample stock solution* in water. Inject the *Sample solution* within 20 min of preparation.

Chromatographic system

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

Mode: LC

Detector: UV 254 nm

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

Flow rate: 1 mL/min

Injection volume: 10 µL

System suitability

Sample: *System suitability solution*

[NOTE—The relative retention times for ceftiofur delta-3 isomer and ceftiofur are 0.98 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 1.5 between ceftiofur delta-3 isomer and ceftiofur

Analysis

Samples: *Sample solution* and *Peak identification solution*

[NOTE—The elution order of the *N*-deacyl ceftiofur and cefotaxime peaks may be reversed depending on the column used. Determine the location of the cefotaxime peak by using the *Peak identification solution*.]

Calculate the percentage of each impurity in the portion of Ceftiofur Hydrochloride taken:

$$\text{Result} = \{r_u/[r_s + \Sigma(r_u/F)]\} \times (1/F) \times 100$$

r_u = peak response of each impurity from the *Sample solution*

r_s = peak response of ceftiofur from the *Sample solution*