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Tetracycline Hydrochloride Tablets

DEFINITION
Tetracycline Hydrochloride Tablets contain NLT 90.0% and NMT 125.0% of the labeled amount of tetracycline hydrochloride ($C_{22}H_{24}N_2O_8 \cdot HCl$).

IDENTIFICATION

Change to read:

• **▲A.▲** (USP 1-Aug-2023) The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.

Add the following:

▲• B. The UV spectrum of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.▲ (USP 1-Aug-2023)

ASSAY

Change to read:

• **Procedure**

▲Diluent: Dimethylformamide and 0.1 M ammonium oxalate (27:68)

Mobile phase: Dimethylformamide, 0.1 M ammonium oxalate, and 0.2 M ammonium phosphate, dibasic (27:68:5). If necessary, adjust with 3 N ammonium hydroxide or 3 N phosphoric acid to a pH of 7.6–7.7.

System suitability solution: 100 µg/mL of USP Tetracycline Hydrochloride RS and 25 µg/mL of USP 4-Epianhydrotetracycline Hydrochloride RS in *Diluent*

Standard solution: 0.5 mg/mL of USP Tetracycline Hydrochloride RS in *Diluent*▲ (USP 1-Aug-2023)

Sample solution: Nominally 0.5 mg/mL of tetracycline hydrochloride prepared as follows. Transfer a portion of finely powdered Tablets (NLT 20), equivalent to 50 mg of tetracycline hydrochloride, to a 100-mL volumetric flask. Add about 50 mL of *Diluent*, and sonicate for 5 min. Allow to cool, and dilute with *Diluent* to volume.

▲Chromatographic system
(See *Chromatography ⟨621⟩, System Suitability*.)
Mode: LC
Detector: UV 280 nm. For *Identification B*, use a diode array detector in the range of 200–400 nm.
Columns
Guard: 4.6-mm × 3-cm; 10-µm packing L7
Analytical: 4.6-mm × 25-cm; 5- to 10-µm packing L7
Flow rate: 2 mL/min
Injection volume: 20 µL

System suitability
Samples: *System suitability solution* and *Standard solution*
[Note—The relative retention times for 4-epianhydrotetracycline and tetracycline are about 0.9 and 1.0, respectively.]
Suitability requirements
Resolution: NLT 1.2 between 4-epianhydrotetracycline and tetracycline, *System suitability solution*
Relative standard deviation: NMT 1.0%, *Standard solution*

Analysis
Samples: *Standard solution* and *Sample solution*
Calculate the percentage of the labeled amount of tetracycline hydrochloride ($C_{22}H_{24}N_2O_8 \cdot HCl$) in the portion of Tablets taken:

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

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

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

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

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

P = potency of USP Tetracycline Hydrochloride RS (µg/mg)

F = conversion factor, 0.001 mg/µg▲ (USP 1-Aug-2023)

Acceptance criteria: 90.0%–125.0%

PERFORMANCE TESTS

Change to read:

• **Dissolution** ⟨711⟩

Medium: Water; 900 mL

Apparatus 2: 75 rpm. [Note—Maintain a distance of 45 ± 5 mm between the blade and the inside bottom of the vessel.]

Time: 60 min

Standard solution: A known concentration of USP Tetracycline Hydrochloride RS in *Medium*

Sample solution: Pass a portion of the solution under test through a suitable filter. Dilute with *Medium*, if necessary.

Instrumental conditions

Mode: UV

Analytical wavelength: 276 nm

▲**Analysis**

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of tetracycline hydrochloride ($C_{22}H_{24}N_2O_8 \cdot HCl$) dissolved:

$$\text{Result} = (A_U/A_S) \times C_S \times (1/L) \times V \times D \times 100$$

A_U = absorbance of the *Sample solution*

A_S = absorbance of the *Standard solution*

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

L = label claim (mg/Tablet)

V = volume of *Medium*, 900 mL

D = dilution factor for the *Sample solution*, if applicable▲ (USP 1-Aug-2023)

Tolerances: NLT 80% (Q) of the labeled amount of tetracycline hydrochloride ($C_{22}H_{24}N_2O_8 \cdot HCl$) is dissolved.

• **Uniformity of Dosage Units** ⟨905⟩**:** Meet the requirements

IMPURITIES

• **Limit of 4-Epianhydrotetracycline**

Diluent, Mobile phase, Sample solution, System suitability solution, Chromatographic system, and **System suitability:** Proceed as directed in the *Assay*.

Standard solution: 0.015 mg/mL of USP 4-Epianhydrotetracycline Hydrochloride RS in *Diluent*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of 4-epianhydrotetracycline hydrochloride in the portion of Tablets taken:

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

r_U = peak response of 4-epianhydrotetracycline from the *Sample solution*

r_S = peak response of 4-epianhydrotetracycline from the *Standard solution*

C_S = concentration of USP 4-Epianhydrotetracycline Hydrochloride RS in the *Standard solution* (mg/mL)

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

Acceptance criteria: NMT 3.0%

SPECIFIC TESTS

• **Loss on Drying** ⟨731⟩

Sample: About 100 mg, accurately weighed

Analysis: Dry the *Sample* under a vacuum at a pressure not exceeding 5 mm of mercury at 60° for 3 h.

Acceptance criteria: NMT 3.0%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight, light-resistant containers.

Change to read:

• **USP Reference Standards** ⟨11⟩

USP 4-Epianhydrotetracycline Hydrochloride RS

▲(4*R*,4a*S*,12a*S*)-4-(Dimethylamino)-3,10,11,12a-tetrahydroxy-6-methyl-1,12-dioxo-1,4,4a,5,12,12a-hexahydrotetracene-2-carboxamide hydrochloride.

$C_{22}H_{22}N_2O_7 \cdot HCl$ 462.88▲ (USP 1-Aug-2023)

USP Tetracycline Hydrochloride RS

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

Topic/Question	Contact	Expert Committee
TETRACYCLINE HYDROCHLORIDE TABLETS	Documentary Standards Support	SM12020 Small Molecules 1
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM12020 Small Molecules 1

Chromatographic Database Information: Chromatographic Database

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