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Ampicillin Tablets

DEFINITION

Ampicillin Tablets contain an amount of Ampicillin (anhydrous form or trihydrate form) equivalent to NLT 90.0% and NMT 120.0% of the labeled amount of ampicillin ($C_{16}H_{19}N_3O_4S$).

IDENTIFICATION

• **A. Thin-Layer Chromatography**

Diluent: Acetone and 0.1 N hydrochloric acid (4:1)

Standard solution: 5 mg/mL of USP Ampicillin RS in *Diluent*

Sample solution: 5 mg/mL of ampicillin from powdered Tablets in *Diluent*

Chromatographic system

(See *Chromatography ⟨621⟩, Thin-Layer Chromatography*.)

Adsorbent: 0.25-mm layer of chromatographic silica gel mixture

Application volume: 2 µL

Developing solvent system: Acetone, toluene, glacial acetic acid, and water (650:100:25:100)

Spray reagent: 3 mg/mL of ninhydrin in alcohol

Analysis

Samples: *Standard solution* and *Sample solution*

Apply the *Standard solution* and the *Sample solution* to the plate, and develop the chromatogram using the *Developing solvent system*. When the solvent front has moved about three-fourths of the length of the plate, remove the plate from the chamber, mark the solvent front, and allow to air-dry. Locate the spots on the plate by spraying lightly with the *Spray reagent*, and dry at 90° for 15 min.

Acceptance criteria: The R_F value of the principal spot of the *Sample solution* corresponds to that of the *Standard solution*.

ASSAY

• **Procedure**

Standard solution: Prepare as directed for *Standard Preparation* in *Iodometric Assay—Antibiotics ⟨425⟩*, using USP Ampicillin RS.

Sample solution: Place NLT 5 Tablets in a high-speed glass blender jar containing an accurately measured volume of water, and blend for 4 ± 1 min. Dilute a suitable aliquot with water to obtain a concentration of 1.25 mg/mL of ampicillin.

Analysis

Samples: *Standard solution* and *Sample solution*

Proceed as directed for *Procedure* in *Iodometric Assay—Antibiotics ⟨425⟩*.

Calculate the percentage of the labeled amount of ampicillin ($C_{16}H_{19}N_3O_4S$) in the portion of Tablets taken:

$$\text{Result} = (B - I) \times (F_1/2) \times (1/C_U) \times F_2 \times 100$$

B = volume of 0.01 N sodium thiosulfate consumed in the *Blank Determination* (mL)

I = volume of 0.01 N sodium thiosulfate consumed in the *Inactivation and Titration* of the *Sample solution* (mL)

F_1 = factor as calculated in *Iodometric Assay—Antibiotics ⟨425⟩*

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

F_2 = conversion factor, 0.001 mg/µg

Acceptance criteria: 90.0%–120.0%

PERFORMANCE TESTS

• **Dissolution,** *Procedure for a Pooled Sample*⟨711⟩

Medium: Water; 900 mL

Apparatus 1: 100 rpm

Time: 45 min

Standard solution: *L*/900 mg/mL of USP Ampicillin RS in water, where *L* is the labeled amount of ampicillin in mg/Tablet

Sample solution: Use a filtered portion of the solution under test.

Solution A: 1 in 1000 solution of polyoxyethylene (23) lauryl ether in water

Solution B: Dissolve 20 g of hydroxylamine hydrochloride in 5 mL of *Solution A*, and add water to make 1000 mL.

Buffer: 26 mg/mL of sodium hydroxide and 3.1 mg/mL of sodium acetate in water

Ferric nitrate solution: Suspend 233 g of ferric nitrate in about 600 mL of water, add 2.8 mL of sulfuric acid, stir until the ferric nitrate is dissolved, add 1 mL of polyoxyethylene (23) lauryl ether, dilute with water to 1000 mL, and mix.

Apparatus: Automatic analyzer consisting of (1) a liquid sampler, (2) a proportioning pump, (3) suitable spectrophotometers equipped with matched flow cells and analysis capability at 480 nm, (4) a means of recording spectrophotometric readings, and/or computer for data retrieval and calculation, and (5) a manifold consisting of the components illustrated in *Figure 1*.

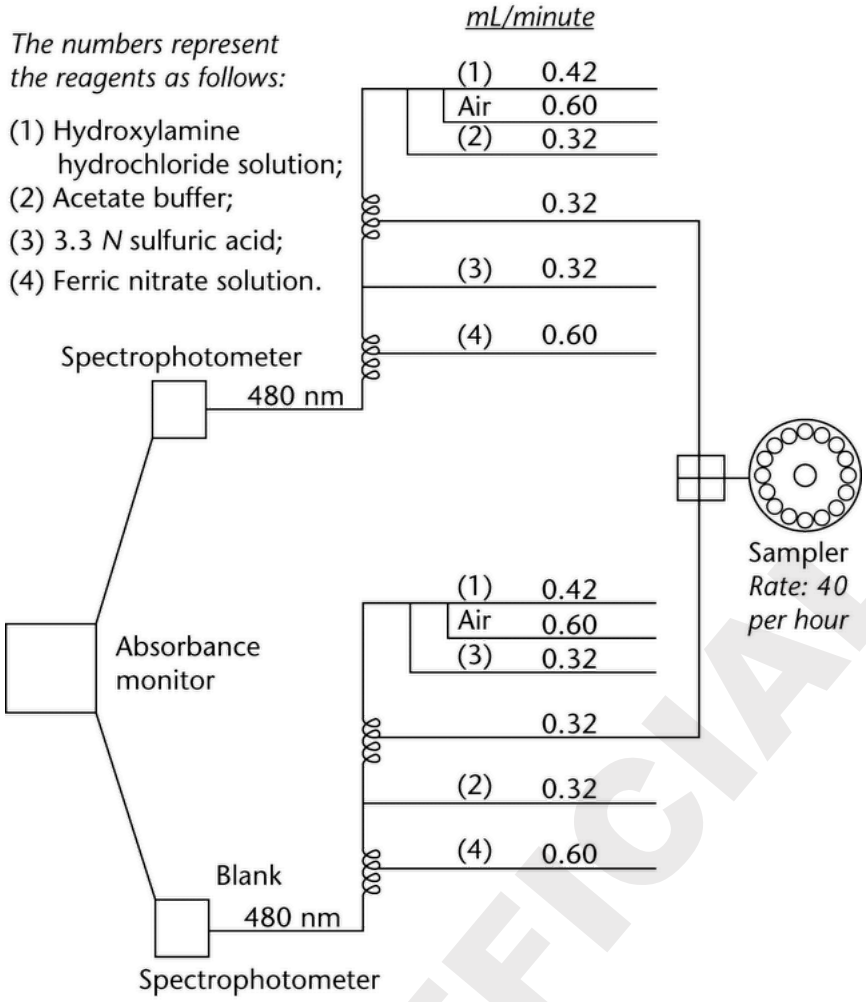

Figure 1

Analysis

Samples: *Standard solution* and *Sample solution*

With the sample line pumping water, the other lines pumping their respective reagents, and the spectrophotometer set at 480 nm, standardize the system until a steady absorbance baseline has been established. Transfer portions of the *Standard solution* and the *Sample solution* to sampler cups, and place in the sampler. Start the sampler, and conduct determinations of the *Standard solution* and the *Sample solution* typically at the rate of 40/h using a ratio of about 2:1 for sample and wash time.

Calculate the percentage of the labeled amount of ampicillin ($C_{16}H_{19}N_3O_4S$) dissolved:

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

A_U = response of the *Sample solution*

A_S = response of the *Standard solution*

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

V = volume of medium, 900 mL

P = potency of ampicillin in USP Ampicillin RS (µg/mg)

F = conversion factor, 0.001 mg/µg

L = label claim (mg/Tablet)

Tolerances: NLT 75% (Q) of the labeled amount of ampicillin ($C_{16}H_{19}N_3O_4S$) is dissolved.

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

SPECIFIC TESTS

• **Water Determination,** *Method I* ⟨921⟩

Type of Tablets	Form of Ampicillin	Limit (%)
Nonchewable	Anhydrous	NMT 4.0
Nonchewable	Trihydrate	9.5–12.0
Chewable	Anhydrous	NMT 3.0
Chewable	Trihydrate	NMT 5.0
Tablets labeled for veterinary use only	Trihydrate	NMT 13.0

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight containers, and store at controlled room temperature.

• **Labeling:** Label the Tablets to indicate whether the ampicillin therein is in the anhydrous form or is the trihydrate. Label chewable Tablets to indicate that they are to be chewed before swallowing. Tablets intended for veterinary use only are so labeled.

• **USP Reference Standards ⟨11⟩**
USP Ampicillin RS

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

Topic/Question	Contact	Expert Committee
AMPICILLIN 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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