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Risedronate Sodium Tablets

DEFINITION
Risedronate Sodium Tablets contain NLT 90.0% and NMT 110.0% of the labeled amount of risedronate sodium ($C_7H_{10}NNaO_7P_2$).

IDENTIFICATION

Change to read:

• **A.** ▲**Spectroscopic Identification Tests** ⟨197⟩, *Infrared Spectroscopy*: **197K**▲ (CN 1-May-2020)

Sample: Transfer a quantity of Tablets, equivalent to 50–75 mg of risedronate sodium, to a suitable flask. Add 10 mL of water, and shake. Pass first through a suitable paper filter, and then through a nylon filter of 0.45-µm pore size. Add 10 mL of 0.2 M cupric chloride solution, mix well, and allow the solution to stand for about 10 min. Add 2 mL of dehydrated alcohol, mix well, and allow the solution to stand for a minimum of 1 h, to form a blue precipitate of the copper complex. Collect the precipitate using a nylon filter of 0.45-µm pore size, wash it with 10 mL of dehydrated alcohol, and allow it to dry on the filter. [Note—Dry the precipitate under ambient conditions; do not heat the precipitate. A modest change of color (from blue to green) may be observed upon drying.]

Standard: Dissolve 50 mg of USP Risedronate Sodium RS in 10 mL of water, and pass the solution through a nylon filter of 0.45-µm pore size. Proceed as directed for the *Sample*, beginning with "Add 10 mL of 0.2 M cupric chloride solution..."

Acceptance criteria: Meet the requirements

• **B.** The retention time of the major peak in the *Sample solution* corresponds to that of the *Standard solution,* as obtained in the *Assay.*

ASSAY

• **Procedure**

For Tablets labeled to contain 5–35 mg of risedronate sodium

Mobile phase: 1.8 g/L of edetate disodium in water. Adjust with 1 N sodium hydroxide to a pH of 9.5 ± 0.1.

System suitability solution: 0.15 mg/mL of anhydrous USP Risedronate Sodium RS and 7.5 µg/mL of USP Risedronate Related Compound C RS in *Mobile phase*

Standard solution: 0.1–0.15 mg/mL of anhydrous USP Risedronate Sodium RS in *Mobile phase*

Sample stock solution: Transfer 10 Tablets to a suitable volumetric flask, add *Mobile phase* to about 60% of the volume of the flask, shake for about 10 min, then sonicate for a minimum of 5 min. Cool the solution to room temperature, and dilute with *Mobile phase* to volume to obtain a solution having a known concentration of about 0.5–1.5 mg/mL.

Sample solution: Nominally 0.1–0.15 mg/mL of risedronate sodium in *Mobile phase*, dilute from the *Sample stock solution*. Pass a portion of this solution through a nylon filter of 0.22-µm pore size, discarding the first 3 mL of the filtrate.

Chromatographic system

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

Mode: LC

Detector: UV 263 nm

Column: 4.0-mm × 25-cm; 10-µm packing L48

Flow rate: 0.8 mL/min

Injection volume: 20 µL

System suitability

Samples: *System suitability solution* and *Standard solution*

Suitability requirements

Resolution: NLT 2.5 between risedronate related compound C and risedronate, *System suitability solution*

Relative standard deviation: NMT 2.0% for three replicate injections, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of risedronate sodium ($C_7H_{10}NNaO_7P_2$) in the portion of Tablets taken:

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

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

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

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

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

Acceptance criteria: 90.0%–110.0%

For Tablets labeled to contain at least 75 mg of risedronate sodium

Mobile phase: 1.8 g/L of edetate disodium in water. Adjust with 1 N sodium hydroxide to a pH of 9.5 ± 0.1.

Standard solution: 0.25 mg/mL of anhydrous USP Risedronate Sodium RS and 4 µg/mL of USP Risedronate Related Compound A RS in *Mobile phase*

Sample stock solution: Transfer 10 Tablets to a suitable container. Add 400 mL of *Mobile phase,* cap, and mechanically shake for 5–15 min, using an orbital or other suitable shaker. [NOTE—Additional sonication for 5–15 min may be performed if necessary.]

Sample solution: Nominally 0.2–0.3 mg/mL of risedronate sodium in *Mobile phase*, dilute from the *Sample stock solution*. Pass a portion of this solution through a nylon filter of 0.45-µm pore size, discarding the first few mL of the filtrate.

Chromatographic system

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

Mode: LC

Detector: UV 263 nm

Column: 4.0-mm × 25-cm; 10-µm packing L48

Flow rate: 1.0 mL/min

Injection volume: 50 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Resolution: NLT 2.0 between risedronate related compound A and risedronate peaks

Tailing factor: NMT 1.5 for risedronate peak

Relative standard deviation: NMT 1.5% for the risedronate peak from three replicate injections

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of risedronate sodium ($C_7H_{10}NNaO_7P_2$) in the portion of Tablets taken:

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

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

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

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

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

Acceptance criteria: 90.0%–110.0%

PERFORMANCE TESTS

• **DISSOLUTION ⟨711⟩**

For Tablets labeled to contain 5, 30, or 35 mg

Medium: Water; 500 mL, deaerated

Apparatus 2: 50 rpm, paddles coated with Teflon

Time: 30 min

Mobile phase: Prepare as directed in the *Assay*.

Standard stock solution: 1 mg/mL of anhydrous USP Risedronate Sodium RS in *Medium*

Standard solution: (0.002 × *L*) mg/mL of USP Risedronate Sodium RS in *Medium* from the *Standard stock solution*, where *L* is the Tablet label claim in mg

Sample solution: Use a portion of the solution under test, filter if necessary.

Chromatographic system

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

Mode: LC

Detector: UV 263 nm

Column: 4.0-mm × 5-cm; 10-µm packing L48

Flow rate: 0.8 mL/min

Injection volume: 20 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 2%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of risedronate sodium ($C_7H_{10}NNaO_7P_2$) dissolved:

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

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

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

C_S = concentration USP Risedronate Sodium RS in the *Standard solution* (mg/mL)

L = label claim (mg/Tablet)

V = volume of *Medium*, 500 mL

Tolerances: NLT 80% (Q) of the labeled amount of risedronate sodium is dissolved.

For Tablets labeled to contain at least 75 mg

Medium: Water; 900 mL, deaerated

Apparatus 2: 50 rpm, paddles coated with Teflon

Time: 45 min

Standard solution: 0.12 mg/mL of anhydrous USP Risedronate Sodium RS in *Medium*

Sample solution: Use a portion of the solution under test. Dilute with *Medium*, if necessary.

Instrumental conditions

Mode: UV

Analytical wavelength: Wavelength of maximum absorption at about 263 nm, with a background correction at 400 nm

Cell: 5 mm

Blank: *Medium*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of risedronate sodium ($C_7H_{10}NNaO_7P_2$) dissolved:

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

A_U = absorbance of the *Sample solution*

A_S = absorbance of the *Standard solution*

C_S = concentration of the *Standard solution* (mg/mL)

L = label claim (mg/Tablet)

D = dilution factor of the *Sample solution*

V = volume of *Medium*, 900 mL

Tolerances: NLT 75% (Q) of the labeled amount of risedronate sodium is dissolved.

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

ADDITIONAL REQUIREMENTS

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

• **USP Reference Standards** ⟨11⟩

USP Risedronate Related Compound A RS

2-Pyridinil isomer [1-hydroxy-2-(2-pyridinyl)ethyl idene]bis(phosphonic acid) monohydrate.

$C_7H_{11}NO_7P_2$ 283.12

USP Risedronate Related Compound C RS

[2-(3-Pyridinyl)ethylidene-1,1]bis(phosphonic acid).

$C_7H_{11}NO_6P_2$ 267.11

USP Risedronate Sodium RS

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

Topic/Question	Contact	Expert Committee
RISEDRONATE SODIUM TABLETS	Documentary Standards Support	SM32020 Small Molecules 3
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM32020 Small Molecules 3

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
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