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Add the following:

▲Rivaroxaban Tablets

DEFINITION
Rivaroxaban Tablets contain NLT 90.0% and NMT 110.0% of the labeled amount of rivaroxaban ($C_{19}H_{18}ClN_3O_5S$).

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

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

ASSAY
• **Procedure**
Protect solutions containing rivaroxaban from light.

Solution A: 0.01 M phosphoric acid

Solution B: Acetonitrile

Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	92	8
13.0	49	51
13.1	92	8
16.0	92	8

Diluent: *Solution A* and *Solution B* (40:60)

Standard solution: 0.2 mg/mL of USP Rivaroxaban RS in *Diluent*

Sample solution: Nominally 0.2 mg/mL of rivaroxaban prepared as follows. Transfer Tablets (NLT 4) into an appropriate volumetric flask. Add a suitable amount of *Diluent* and sonicate to disintegrate and dissolve. Dilute with *Diluent* to volume. Pass the solution through a suitable filter of 0.45-µm pore size.

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

Mode: LC

Detector: UV 250 nm. For *Identification B*, use a diode array detector in the range of 200–400 nm.

Column: 4.0-mm × 5.5-cm; 3-µm packing L1

Column temperature: 45°

Flow rate: 1 mL/min

Injection volume: 5 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 1.5

Relative standard deviation: NMT 1.5%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of rivaroxaban ($C_{19}H_{18}ClN_3O_5S$) in the portion of Tablets taken:

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

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

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

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

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

Acceptance criteria: 90.0%–110.0%

PERFORMANCE TESTS

• **Dissolution ⟨711⟩**

Buffer: 0.022 M sodium acetate; adjusted with sodium hydroxide or glacial acetic acid to a pH of 4.5

Medium

For 2.5-mg Tablets: *Buffer*; 900 mL

For 10-mg Tablets: 0.2% sodium dodecyl sulfate in *Buffer*; 900 mL

For 15-mg and 20-mg Tablets: 0.4% sodium dodecyl sulfate in *Buffer*; 900 mL

Apparatus 2: 75 rpm

Times: 15 min for 10-mg, 15-mg, and 20-mg Tablets; 20 min for 2.5-mg Tablets

Mobile phase: Acetonitrile and water (40:60)

Standard stock solution: 0.55 mg/mL of USP Rivaroxaban RS in acetonitrile

Standard solution

For 2.5-mg Tablets: 0.003 mg/mL of USP Rivaroxaban RS from the *Standard stock solution* in *Medium*

For 10-mg Tablets: 0.01 mg/mL of USP Rivaroxaban RS from the *Standard stock solution* in *Medium*

For 15-mg and 20-mg Tablets: 0.02 mg/mL of USP Rivaroxaban RS from the *Standard stock solution* in *Medium*

Sample solution: Pass a portion of the solution under test through a suitable filter of 10-µm pore size.

Chromatographic system

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

Mode: LC

Detector: UV 250 nm

Column: 4.0-mm × 6.0-cm; 3-µm packing L1

Column temperature: 40°

Flow rate: 1 mL/min

Injection volume: 10 µL for 10-mg, 15-mg, and 20-mg Tablets; 20 µL for 2.5-mg Tablets

Run time: NLT 3 times the retention time of rivaroxaban

System suitability

Sample: *Standard solution*

Suitability requirements

Relative standard deviation: NMT 1.5%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of rivaroxaban ($C_{19}H_{18}ClN_3O_5S$) dissolved:

$$\text{Result} = (r_U/r_S) \times C_S \times V \times (1/L) \times 100$$

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

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

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

V = volume of *Medium*, 900 mL

L = label claim (mg/Tablet)

Tolerances: NLT 80% (Q) of the labeled amount of rivaroxaban ($C_{19}H_{18}ClN_3O_5S$) is dissolved.

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

IMPURITIES

• **Organic Impurities**

Protect solutions containing rivaroxaban from light.

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

System suitability solution: 2 µg/mL each of USP Rivaroxaban RS and USP Rivaroxaban Related Compound H RS in *Diluent*

Sensitivity solution: 0.2 µg/mL of USP Rivaroxaban RS from the *Standard solution* in *Diluent*

System suitability

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

[Note—See *Table 2* for the relative retention times.]

Suitability requirements

Resolution: NLT 2.0 between rivaroxaban and rivaroxaban related compound H, *System suitability solution*

Relative standard deviation: NMT 1.5%, *Standard solution*

Signal-to-noise ratio: NLT 10 for rivaroxaban, *Sensitivity solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of any unspecified degradation product in the portion of Tablets taken:

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

r_U = peak response of each unspecified degradation product from the *Sample solution*

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

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

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

Acceptance criteria: See *Table 2*. The reporting threshold is 0.1%.

Table 2

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Rivaroxaban	1.0	—
Rivaroxaban related compound H[a]	1.2	—
Any unspecified degradation product	—	0.2
Total degradation products	—	0.5

[a] This impurity is included for establishing the *Resolution* requirement in *System suitability*.

ADDITIONAL REQUIREMENTS

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

• **USP Reference Standards ⟨11⟩**

USP Rivaroxaban RS

USP Rivaroxaban Related Compound H RS

(*S*)-4,5-Dichloro-*N*-({2-oxo-3-[4-(3-oxomorpholino)phenyl]oxazolidin-5-yl}methyl)thiophene-2-carboxamide.

$C_{19}H_{17}Cl_2N_3O_5S$ 470.32▲ (USP 1-May-2023)

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

Topic/Question	Contact	Expert Committee
RIVAROXABAN TABLETS	Documentary Standards Support	SM22020 Small Molecules 2
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM22020 Small Molecules 2

Chromatographic Database Information: Chromatographic Database

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