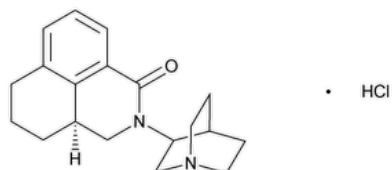


Status: Currently Official on 16-Feb-2025
 Official Date: Official as of 01-Jan-2023
 Document Type: USP Monographs
 DocId: GUID-2EBDA281-B069-4A7D-AF3C-83D0F2FCC343_6_en-US
 DOI: https://doi.org/10.31003/USPNF_M1026_06_01
 DOI Ref: cv86b

© 2025 USPC
 Do not distribute

Palonosetron Hydrochloride



$C_{19}H_{24}N_2O \cdot HCl$ 332.87

1*H*-Benzo[de]isoquinoline-1-one, 2,3,3a,4,5,6-hexahydro-2-[(3*S*)-1-azabicyclo[2.2.2]octan-3-yl],(3*S*)-, hydrochloride;

(*S*)-2-[(3*S*)-Quinuclidin-3-yl]-2,3,3a,4,5,6-hexahydro-1*H*-benzo[de]isoquinolin-1-one hydrochloride CAS RN®: 135729-62-3; UNII: 23310D4119.

DEFINITION

Palonosetron Hydrochloride contains NLT 98.0% and NMT 102.0% of palonosetron hydrochloride ($C_{19}H_{24}N_2O \cdot HCl$), calculated on the dried basis.

IDENTIFICATION

- **A. SPECTROSCOPIC IDENTIFICATION TESTS (197), Infrared Spectroscopy:** 197A or 197K
- **B.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the Assay.
- **C. IDENTIFICATION TESTS—GENERAL (191), Chemical Identification Tests, Chloride:** Meets the requirements

ASSAY

PROCEDURE

Mobile phase: [Acetonitrile](#), [water](#), and [trifluoroacetic acid](#) (280: 720: 0.67)

Standard stock solution: 0.7 mg/mL of [USP Palonosetron Hydrochloride RS](#) in [methanol](#). Sonicate to dissolve, if necessary.

Standard solution: 0.014 mg/mL of [USP Palonosetron Hydrochloride RS](#) from the *Standard stock solution*, in *Mobile phase*

Sample stock solution: 0.7 mg/mL of Palonosetron Hydrochloride in [methanol](#). Sonicate to dissolve, if necessary.

Sample solution: 0.014 mg/mL of Palonosetron Hydrochloride from the *Sample stock solution*, in *Mobile phase*

Chromatographic system

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

Mode: LC

Detector: UV 210 nm

Column: 4.6-mm × 25-cm; 5-μm packing [L7](#)

Flow rate: 1 mL/min

Injection volume: 80 μL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 0.73%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of palonosetron hydrochloride ($C_{19}H_{24}N_2O \cdot HCl$) in the portion of Palonosetron Hydrochloride taken:

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

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

r_s = peak response of palonosetron from the *Standard solution*

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

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

Acceptance criteria: 98.0%–102.0% on the dried basis

IMPURITIES

• **RESIDUE ON IGNITION (281):** NMT 0.1%

LIMIT OF SPECIFIED IMPURITIES

Mobile phase: *n*-Hexane, dehydrated alcohol, methanol, diethylamine, and trifluoroacetic acid (85: 7.5: 7.5: 0.2: 0.05)

System suitability stock solution 1: 0.05 mg/mL of each [USP Palonosetron Related Compound B RS](#), [USP Palonosetron Related Compound C RS](#), and [USP Palonosetron Enantiomer RS](#) in *Mobile phase*. Sonicate to dissolve, if necessary.

System suitability stock solution 2: 0.05 mg/mL [USP Palonosetron Related Compound E RS](#) in *Mobile phase*. Sonicate to dissolve, if necessary.

System suitability stock solution 3: 0.05 mg/mL [USP Palonosetron Related Compound D RS](#) in *Mobile phase*. Sonicate to dissolve, if necessary.

System suitability solution: 0.5 µg/mL each of [USP Palonosetron Related Compound B RS](#), [USP Palonosetron Related Compound C RS](#), and [USP Palonosetron Enantiomer RS](#) from *System suitability stock solution 1*; 2.5 µg/mL of [USP Palonosetron Related Compound E RS](#) from *System suitability stock solution 2*; 1.5 µg/mL of [USP Palonosetron Related Compound D RS](#) from *System suitability stock solution 3*; and 0.5 mg/mL of [USP Palonosetron Hydrochloride RS](#) in *Mobile phase*

Sensitivity solution: 0.25 µg/mL of [USP Palonosetron Hydrochloride RS](#) from *Standard solution*, in *Mobile phase*

Standard solution: 0.5 µg/mL of [USP Palonosetron Hydrochloride RS](#) in *Mobile phase*. Sonicate to dissolve, if necessary.

Sample solution: 500 µg/mL of Palonosetron Hydrochloride in *Mobile phase*. Sonicate to dissolve, if necessary.

Chromatographic system

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

Mode: LC

Detector: UV 240 nm

Column: 4.6-mm × 25-cm; 5-µm packing [L40](#)

Temperatures

Autosampler: 10°

Column: 20°

Flow rate: 0.5 mL/min

Injection volume: 20 µL

Run time: NLT 3 times the retention time of palonosetron

System suitability

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

[NOTE—See [Table 1](#) for the relative retention times.]

Suitability requirements

Resolution: NLT 1.4 between palonosetron related compound C and palonosetron; NLT 2.5 between palonosetron and palonosetron related compound E, *System suitability solution*

Tailing factor: NLT 0.8 and NMT 2.0, *Standard solution*

Relative standard deviation: NMT 5.0%, *Standard solution*

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

Analysis

Samples: *Standard solution* and *Sample solution*

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

$$\text{Result} = (r_u/r_s) \times (C_s/C_u) \times (1/F) \times 100$$

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

r_s = peak response of palonosetron from the *Standard solution*

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

C_u = concentration of Palonosetron Hydrochloride in the *Sample solution* (µg/mL)

