

Status: Currently Official on 17-Feb-2025

Official Date: Official as of 01-Aug-2022

Document Type: USP Monographs

DocId: GUID-EA6F74E6-B768-4D65-B69B-D814E29C2188_2_en-US

DOI: https://doi.org/10.31003/USPNF_M931_02_01

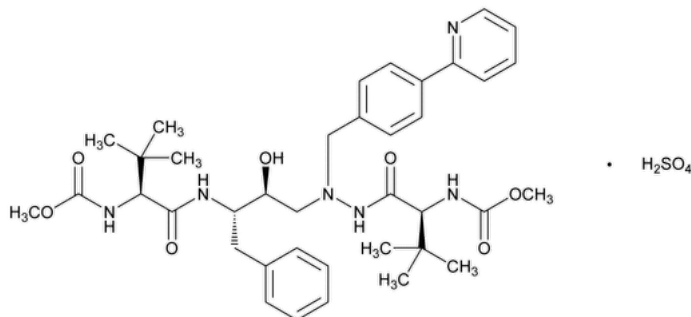
DOI Ref: i2xmx

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Add the following:

▲Atazanavir Sulfate


 $C_{38}H_{52}N_6O_7 \cdot H_2SO_4$ 802.93

2,5,6,10,13-Pentaazatetradecanedioic acid, 3-12-bis(1,1-dimethylethyl)-8-hydroxy-4,11-dioxo-9-(phenylmethyl)-6-[[4-(2-pyridinyl)phenyl]methyl]-, dimethyl ester, (3S,8S,9S,12S)-, sulfate (1:1) (salt);

Dimethyl (3S,8S,9S,12S)-9-benzyl-3,12-di-tert-butyl-8-hydroxy-4,11-dioxo-6-(p-2-pyridylbenzyl)-2,5,6,10,13-pentaazatetradecanedioate, sulfate (1:1) (salt) CAS RN®: 229975-97-7.

DEFINITION

Atazanavir Sulfate contains NLT 98.0% and NMT 102.0% of atazanavir sulfate ($C_{38}H_{52}N_6O_7 \cdot H_2SO_4$), calculated on the anhydrous and solvent-free 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, Sulfate*: Meets the requirements

ASSAY

PROCEDURE

Buffer: 2.73 g/L of [monobasic potassium phosphate](#) in [water](#). Adjust with [phosphoric acid](#) to a pH of 3.5.

Mobile phase: [Acetonitrile](#) and *Buffer* (50:50)

System suitability solution: 0.4 mg/mL of [USP Atazanavir System Suitability Mixture RS](#) in *Mobile phase*. Sonicate, if necessary, to dissolve prior to final dilution.

Standard solution: 0.4 mg/mL of [USP Atazanavir Sulfate RS](#) in *Mobile phase*. Sonicate, if necessary, to dissolve prior to final dilution.

Sample solution: 0.4 mg/mL of Atazanavir Sulfate in *Mobile phase*. Sonicate, if necessary, to dissolve prior to final dilution.

Chromatographic system

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

Mode: LC

Detector: UV 215 nm

Column: 4.6-mm × 15-cm; 3-μm packing [L1](#)

Flow rate: 1 mL/min

Injection volume: 10 μL

Run time: NLT 1.5 times the retention time of atazanavir

System suitability

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

[NOTE—The relative retention times for atazanavir *R,S,S,S*-diastereomer and atazanavir are 0.9 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 1.5 between atazanavir *R,S,S,S*-diastereomer and atazanavir, *System suitability solution*

Tailing factor: 0.8–1.5 for the atazanavir peak, *System suitability solution*

Relative standard deviation: NMT 0.73%, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of atazanavir sulfate ($C_{38}H_{52}N_6O_7 \cdot H_2SO_4$) in the portion of Atazanavir Sulfate taken:

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

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

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

C_S = concentration of [USP Atazanavir Sulfate RS](#) in the *Standard solution* (mg/mL)

C_U = concentration of Atazanavir Sulfate in the *Sample solution* (mg/mL)

Acceptance criteria: 98.0%–102.0% on the anhydrous and solvent-free basis

IMPURITIES

- [RESIDUE ON IGNITION \(281\)](#): NMT 0.2%

ORGANIC IMPURITIES

[NOTE—Perform either *Procedure 1* or *Procedure 2*, depending on the synthetic route. *Procedure 2* is recommended if atazanavir formyl, ethyl, amine, or valine analogs are potential impurities.]

• PROCEDURE 1

Buffer, System suitability solution, Sample solution, and Chromatographic system: Proceed as directed in the Assay.

Solution A: [Acetonitrile](#) and *Buffer* (25:75)

Solution B: [Acetonitrile](#) and *Buffer* (75:25)

Mobile phase: See [Table 1](#).

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	100	0
5	100	0
45	0	100
50	100	0
60	100	0

Diluent: *Solution A* and *Solution B* (50:50)

Standard solution: 0.4 µg/mL of [USP Atazanavir Sulfate RS](#) in *Diluent*. Sonicate, if necessary, to dissolve prior to final dilution.

System suitability

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

Suitability requirements

Resolution: NLT 1.5 between atazanavir *R,S,S*-diastereomer and atazanavir, *System suitability solution*

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

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of any individual impurity in the portion of Atazanavir Sulfate taken:

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

r_U = peak response of any individual impurity from the *Sample solution*

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

C_S = concentration of [USP Atazanavir Sulfate RS](#) in the *Standard solution* (mg/mL)

C_U = concentration of Atazanavir Sulfate in the *Sample solution* (mg/mL)

F = relative response factor (see [Table 2](#))

Acceptance criteria: See [Table 2](#). The reporting threshold is 0.05%.

Table 2