

Status: Currently Official on 14-Feb-2025
Official Date: Official as of 01-May-2020
Document Type: USP Monographs
DocId: GUID-24B36985-5455-4E68-9624-E1063589BDC7_2_en-US
DOI: https://doi.org/10.31003/USPNF_M29084_02_01
DOI Ref: p5txh

© 2025 USPC
Do not distribute

Efavirenz Capsules

DEFINITION

Efavirenz Capsules contain NLT 92.0% and NMT 108.0% of the labeled amount of efavirenz (C₁₄H₉ClF₃NO₂).

IDENTIFICATION

Change to read:

- **A.** [▲ SPECTROSCOPIC IDENTIFICATION TESTS \(197\), Infrared Spectroscopy: 197K▲](#) (CN 1-MAY-2020)

Sample solution: Dissolve the contents of 1 Capsule in about 5 mL of acetonitrile by mixing on a vortex mixer. Allow to settle, remove about 3 mL of the solution, and centrifuge for about 5 min. Transfer 1–2 mL of supernatant to a clean suitable container, and evaporate to dryness under nitrogen. Mix 0.5–1 mg of the powder with 200 mg of potassium bromide.

Change to read:

- **B.** [▲ SPECTROSCOPIC IDENTIFICATION TESTS \(197\), Ultraviolet-Visible Spectroscopy: 197U▲](#) (CN 1-MAY-2020)

Solvent: Acetonitrile

Standard solution: 10 µg/mL in *Solvent*

Sample solution: Dissolve the contents of 1 Capsule in about 40 mL of *Solvent* by shaking for about 30 min. Pass through a suitable nylon or PVDF membrane filter, discarding the first 2 mL of filtrate, and dilute a portion with acetonitrile to a concentration of 10 µg/mL of efavirenz.

Acceptance criteria: The UV absorption spectrum of the *Sample solution* exhibits maxima and minima at the same wavelengths as does the *Standard solution*.

ASSAY

- **PROCEDURE**

Diluent: Acetonitrile and water (1:1)

Solution A: Methanol, trifluoroacetic acid, and water (1:0.005:9). [NOTE—Use only freshly-opened trifluoroacetic acid, ≤6 months.]

Solution B: Methanol, trifluoroacetic acid, and water (9:0.005:1). [NOTE—Use only freshly-opened trifluoroacetic acid, ≤6 months.]

Mobile phase: See the gradient table below.

Time (min)	Solution A (%)	Solution B (%)
0	60	40
16	50	50
23	35	65
28	30	70
29	20	80
31	20	80
32	60	40
40	60	40

Standard solution 1: 0.2 mg/mL of [USP Efavirenz Related Compound B RS](#) in *Diluent*

Standard solution 2: 5 mg/mL of [USP Efavirenz RS](#) in acetonitrile. [NOTE—Sonicate to dissolve before diluting to final volume.]

Standard solution: 250 µg/mL of [USP Efavirenz RS](#) and 1 µg/mL of [USP Efavirenz Related Compound B RS](#) in *Diluent* prepared from *Standard solution 2* and *Standard solution 1*, respectively. [NOTE—Store protected from light. For the HPLC analysis, it is recommended to use polypropylene vials, because degradation has been noted with certain brands made of glass.]

Sample stock solution: Transfer the contents of NLT 10 Capsules to a suitable container, and extract the contents in acetonitrile by mixing for about 30 min to obtain a quantitative solution equivalent to about 5 mg/mL of efavirenz. [NOTE—Store protected from light.]

Sample solution: Filter a portion of the *Sample stock solution*, and dilute the filtrate with *Diluent* to obtain a solution of about 250 µg/mL of efavirenz. [NOTE—Store protected from light. For the HPLC analysis, it is recommended to use polypropylene vials, because degradation has been noted with certain brands made of glass.]

Chromatographic system

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

Mode: LC

Detector: UV 250 nm

Column: 4.6-mm × 15-cm; packing L10

Column temperature: 40°

Flow rate: 1.5 mL/min

Injection size: 35 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Resolution: NLT 1.2 between efavirenz related compound B and efavirenz

Relative standard deviation: NMT 2.0% for efavirenz

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of efavirenz ($C_{14}H_9ClF_3NO_2$) in the portion of Capsules taken:

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

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

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

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

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

Acceptance criteria: 92.0%–108.0%

PERFORMANCE TESTS

• [DISSOLUTION \(711\)](#)

Medium: 1.0% (w/v) sodium lauryl sulfate in water; 900 mL. [NOTE—Do not deaerate.]

Apparatus 2: 50 rpm, with helix sinker

Time: 45 min

Standard solution: (L/900) mg/mL of [USP Efavirenz RS](#) in *Medium*, where L is the Capsule label claim in mg. A small volume of methanol, NMT 10% of the final volume, could be used to solubilize efavirenz. Dilute this solution with *Medium* to obtain a final concentration of about 0.01 mg/mL for Capsules labeled to contain 50 mg, or about 0.02 mg/mL for Capsules labeled to contain 100 mg or 200 mg.

Sample solution: Pass a portion of the solution under test through a suitable filter of 0.45-µm pore size, and dilute with *Medium* to obtain a theoretical concentration similar to the *Standard solution*, assuming complete dissolution of the Capsule label claim.

Analytical wavelength: UV 247 nm

Cell: 1 cm

Blank: *Medium*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of efavirenz 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/Capsule)

D = dilution factor of the *Sample solution*

V = volume of *Medium*, 900 mL

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

• [UNIFORMITY OF DOSAGE UNITS \(905\)](#): Meet the requirements

Procedure for content uniformity