Status: Currently Official on 14-Feb-2025
Official Date: Official as of 01-Sep-2023
Document Type: USP Monographs
DocId: GUID-95CB30BF-A063-43FC-B9A0-40DE91E77828_8_en-US
DOI: https://doi.org/10.31003/USPNF_M9465_08_01
DOI Ref: ulj1g

Bicalutamide Tablets

DEFINITION
Bicalutamide Tablets contain NLT 90.0% and NMT 110.0% of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$).

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 spectrum of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.

ASSAY
Change to read:
- **Procedure**

Mobile phase: Acetonitrile, tetrahydrofuran, and water (15:20:65)

System suitability stock solution: 0.8 mg/mL of USP Bicalutamide RS and 0.4 mg/mL of USP Bicalutamide Related Compound B RS in tetrahydrofuran

System suitability solution: 0.04 mg/mL of USP Bicalutamide RS and 0.02 mg/mL of USP Bicalutamide Related Compound B RS from the *System suitability stock solution* in *Mobile phase*

Standard stock solution: 0.8 mg/mL of USP Bicalutamide RS in tetrahydrofuran

Standard solution: 0.04 mg/mL of USP Bicalutamide RS from the *Standard stock solution* in *Mobile phase*

Sample stock solution: ▲Nominally▲ (IRA 1-Sep-2023) 0.5 mg/mL of bicalutamide ▲from Tablets▲ (IRA 1-Sep-2023) in tetrahydrofuran prepared as follows. Transfer an equivalent to 50 mg of bicalutamide from finely powdered Tablets (NLT 20) into a 100-mL volumetric flask. Add 50 mL of tetrahydrofuran, and sonicate for NLT 10 min to complete dissolution. Allow to cool to room temperature, and dilute with tetrahydrofuran to volume. Pass through a suitable filter of 0.45-µm pore size.

Sample solution: ▲Nominally▲ (IRA 1-Sep-2023) 0.04 mg/mL of bicalutamide from the *Sample stock solution* in *Mobile phase*

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

Mode: LC

Detector: UV 270 nm. For *Identification B*, use a diode array detector in the range of 190–400 nm.

Column: 5-mm × 12.5-cm; 3-µm packing L1

Column temperature: 50°

Flow rate: 1.5 mL/min

Injection volume: 10 µL

▲Run time: NLT 1.5 times the retention time of bicalutamide▲ (IRA 1-Sep-2023)

System suitability

Samples: *System suitability solution* ▲and *Standard solution*▲ (IRA 1-Sep-2023)

[Note—The relative retention times for bicalutamide and bicalutamide related compound B are 1.0 and 1.1, respectively.]

Suitability requirements

Resolution: ▲NLT 2.0▲ (IRA 1-Sep-2023) between bicalutamide and bicalutamide related compound B▲, *System suitability solution*▲ (IRA 1-Sep-2023)

Tailing factor: ▲NMT 1.2, *Standard solution*▲ (IRA 1-Sep-2023)

Relative standard deviation: NMT 1.0%▲, *Standard solution*▲ (IRA 1-Sep-2023)

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$) in the portion of Tablets taken:

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

r_U = peak area ▲of bicalutamide▲ (IRA 1-Sep-2023) from the *Sample solution*

r_S = peak area ▲of bicalutamide▲ (IRA 1-Sep-2023) from the *Standard solution*

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

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

Acceptance criteria: 90.0%–110.0%

PERFORMANCE TESTS

Change to read:

• **Dissolution** ⟨711⟩

Test 1

Medium: ▲10 mg/mL of▲ (IRA 1-Sep-2023) sodium lauryl sulfate in water; 1000 mL

Apparatus 2: 50 rpm

Time: 45 min

Standard solution: 0.05 mg/mL of USP Bicalutamide RS in *Medium* prepared as follows. Transfer an appropriate amount of USP Bicalutamide RS to a suitable volumetric flask, dissolve in tetrahydrofuran equivalent to 1% of the final volume, and dilute with *Medium* to volume.

Sample solution: Pass a portion of the solution under test through a suitable filter of 0.45-µm pore size.

Instrumental conditions

(See *Ultraviolet-Visible Spectroscopy* ⟨857⟩.)

Mode: UV

Analytical wavelength: 270 nm

▲Path length: 0.1 cm▲ (IRA 1-Sep-2023)

Blank: *Medium*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$) dissolved:

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

A_U = absorbance of the *Sample solution*

A_S = absorbance of the *Standard solution*

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

V = volume of *Medium* (mL)

L = label claim (mg/Tablet)

Tolerances: NLT 80% (Q) of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$) is dissolved.

Test 2: If the product complies with this test, the labeling indicates that the product meets USP *Dissolution Test 2*.

▲Medium: 10 mg/mL of sodium lauryl sulfate in water; 1000 mL

Apparatus 2: 50 rpm

Time: 45 min

Standard solution: 0.05 mg/mL of USP Bicalutamide RS in *Medium* prepared as follows. Transfer an appropriate amount of USP Bicalutamide RS to a suitable volumetric flask, dissolve in tetrahydrofuran equivalent to 1% of the final volume, and dilute with *Medium* to volume.

Sample solution: Pass a portion of the solution under test through a suitable filter of 0.45-µm pore size.

Instrumental conditions

(See *Ultraviolet-Visible Spectroscopy* ⟨857⟩.)

Mode: UV

Analytical wavelength: 270 nm

Path length: 0.1 cm

Blank: *Medium*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$) dissolved:

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

A_U = absorbance of the *Sample solution*

A_S = absorbance of the *Standard solution*

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

V = volume of *Medium* (mL)

L = label claim (mg/Tablet)

▲ (IRA 1-Sep-2023)

Tolerances: NLT 75% (*Q*) of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$) is dissolved.

Test 3: If the product complies with this test, the labeling indicates that the product meets USP *Dissolution Test 3*.

Medium: ▲10 mg/mL of▲ (IRA 1-Sep-2023) sodium lauryl sulfate in water; 1000 mL

Apparatus 2: 75 rpm

Time: 60 min

Standard solution: 0.01 mg/mL of USP Bicalutamide RS in *Medium*, sonicate to aid dissolution. ▲▲ (IRA 1-Sep-2023)

Sample solution: Pass a portion of the solution under test through a suitable filter of 0.45-µm pore size. Discard the first few milliliters of the filtrate. Dilute with *Medium* to a concentration that is similar to that of the *Standard solution*.

Instrumental conditions

(See *Ultraviolet-Visible Spectroscopy* ⟨857⟩.)

Mode: UV

Analytical wavelength: 270 nm

Blank: *Medium*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$) dissolved:

$$\text{Result} = (A_U/A_S) \times C_S \times D \times V \times (1/L) \times 100$$

A_U = absorbance of the *Sample solution*

A_S = absorbance of the *Standard solution*

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

D = dilution factor for the *Sample solution*

V = volume of *Medium* (mL)

L = label claim (mg/Tablet)

Tolerances: NLT 80% (*Q*) of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$) is dissolved.

Change to read:

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

Procedure for content uniformity

Diluent: 10 mg/mL of sodium lauryl sulfate in water

Standard solution: 0.05 mg/mL of USP Bicalutamide RS in *Diluent*. ▲Dissolve USP Bicalutamide RS in a minimum volume of tetrahydrofuran before dilution with *Diluent*.▲ (IRA 1-Sep-2023)

Sample stock solution: ▲Nominally 0.5 mg/mL of bicalutamide prepared as follows.▲ (IRA 1-Sep-2023) Transfer 1 Tablet to a 100-mL volumetric flask. Add 10 mL of water, and sonicate for approximately 30 min. Add 80 mL of tetrahydrofuran, and sonicate for 30 min to complete dissolution of bicalutamide. Allow to cool to room temperature, and dilute with tetrahydrofuran to volume. Pass a portion of the solution through a suitable filter of 0.45-µm pore size.

Sample solution: ▲Nominally 0.05 mg/mL of bicalutamide prepared as follows.▲ (IRA 1-Sep-2023) Transfer 10.0 mL of the *Sample stock solution* into a 100-mL volumetric flask, and dilute with *Diluent* to volume.

Instrumental conditions

(See *Ultraviolet-Visible Spectroscopy* ⟨857⟩.)

Mode: UV

Analytical wavelength: 270 nm

▲**Path length:** 0.1 cm▲ (IRA 1-Sep-2023)

Blank: *Diluent*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of bicalutamide ($C_{18}H_{14}F_4N_2O_4S$) in the Tablet taken:

$$\text{Result} = (A_U/A_S) \times (C_S/C_U) \times 100$$

A_U = absorbance of the *Sample solution*

A_S = absorbance of the *Standard solution*

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

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

IMPURITIES

Change to read:

• **Limit of ▲Bicalutamide Aminobenzonitrile▲** (IRA 1-Sep-2023)

Mobile phase, ▲System suitability stock solution,▲ (IRA 1-Sep-2023) and **System suitability solution:** Prepare as directed in the *Assay*.

Standard stock solution: 0.2 mg/mL of USP Bicalutamide RS in tetrahydrofuran

Standard solution: 0.02 mg/mL of USP Bicalutamide RS from the *Standard stock solution* in *Mobile phase*

Sample solution: ▲Nominally 2 mg/mL of bicalutamide from Tablets prepared as follows.▲ (IRA 1-Sep-2023) Transfer the equivalent to 50 mg of bicalutamide from powdered Tablets (NLT 20) to a 25-mL volumetric flask. Add 2 mL of tetrahydrofuran, and allow to stand for 5 min. Add 20 mL of *Mobile phase*, sonicate for 10 min, and allow to cool to room temperature. Dilute with *Mobile phase* to volume, and pass through a suitable filter of 0.2-µm pore size.

Chromatographic system

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

Mode: LC

Detector: UV 220 nm

Column: 5-mm × 12.5-cm; 3-µm packing L1

Column temperature: 50°

Flow rate: 1.5 mL/min

Injection volume: 10 µL

▲Run time: NLT 2 times the retention time of bicalutamide▲ (IRA 1-Sep-2023)

System suitability

Sample: *System suitability solution*

[Note—The relative retention times of ▲bicalutamide aminobenzonitrile,▲ (IRA 1-Sep-2023) bicalutamide, and bicalutamide related compound B are about 0.4, 1.0, and about 1.1, respectively.]

Suitability requirements

Resolution: ▲NLT 2.0▲ (IRA 1-Sep-2023) between bicalutamide and bicalutamide related compound B

Tailing factor: ▲NMT 1.2▲ (IRA 1-Sep-2023) for bicalutamide

Relative standard deviation: NMT 2.0% for bicalutamide

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of ▲bicalutamide aminobenzonitrile▲ (IRA 1-Sep-2023) in the portion of Tablets taken:

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

r_U = peak area of ▲bicalutamide aminobenzonitrile▲ (IRA 1-Sep-2023) from the *Sample solution*

r_S = peak area of bicalutamide from the *Standard solution*

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

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

F = relative response factor for ▲bicalutamide aminobenzonitrile▲ (IRA 1-Sep-2023), 1.4

Acceptance criteria: NMT 0.1%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight containers. Store at controlled room temperature.

• **Labeling:** When more than one *Dissolution* test is given, the labeling states the test used only if *Test 1* is not used.

Change to read:

• **USP Reference Standards ⟨11⟩**

USP Bicalutamide RS

USP Bicalutamide Related Compound B RS

▲*N*-[4-Cyano-3-(trifluoromethyl)phenyl]-3-(3-fluorophenylsulfonyl)-2-hydroxy-2-methylpropanamide;
Also known as▲ (IRA 1-Sep-2023) (*RS*)-*N*-(4-Cyano-3-(trifluoromethyl)phenyl)-3-(3-fluorophenylsulfonyl)-2-hydroxy-2-methylpropanamide.

$C_{18}H_{14}F_4N_2O_4S$ 430.37

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

Topic/Question	Contact	Expert Committee
BICALUTAMIDE TABLETS	Documentary Standards Support	SM32020 Small Molecules 3

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. 49(2)

Current DocID: GUID-95CB30BF-A063-43FC-B9A0-40DE91E77828_8_en-US

DOI: https://doi.org/10.31003/USPNF_M9465_08_01

DOI ref: ulj1g