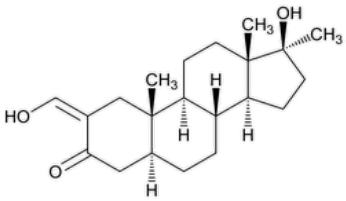
Status: Currently Official on 16-Feb-2025
Official Date: Official as of 01-May-2021
Document Type: USP Monographs
DocId: GUID-18FB929B-2D34-4326-9078-9342B94E5B77_3_en-US
DOI: https://doi.org/10.31003/USPNF_M59680_03_01
DOI Ref: 9t8uk

Oxymetholone



$C_{21}H_{32}O_3$ 332.48

Androstan-3-one, 17-hydroxy-2-(hydroxymethylene)-17-methyl-, (5α,17β)-;

17β-Hydroxy-2-(hydroxymethylene)-17α-methyl-5α-androstan-3-one CAS RN®: 434-07-1; UNII: L76T0ZCA8K.

DEFINITION

Oxymetholone contains NLT 97.0% and NMT 103.0% of oxymetholone ($C_{21}H_{32}O_3$), calculated on the dried basis.

IDENTIFICATION

Change to read:

• **A. Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*:** 197K ▲or 197A▲ (USP 1-May-2021)

Delete the following:

▲• **B. Spectroscopic Identification Tests ⟨197⟩, *Ultraviolet-Visible Spectroscopy*:** 197U

Sample solution: 10 µg/mL in 0.01 N methanolic sodium hydroxide

Acceptance criteria: Meets the requirements ▲ (USP 1-May-2021)

Add the following:

▲• **B.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.▲ (USP 1-May-2021)

ASSAY

Change to read:

• **Procedure**

▲[Note—Protect solutions containing oxymetholone from light.]

Diluted acetic acid: Dilute 2 mL of glacial acetic acid with 1 L of water.

Mobile phase: Tetrahydrofuran, acetonitrile, and *Diluted acetic acid* (32:12:56)

Standard solution: 0.1 mg/mL of USP Oxymetholone RS, prepared as follows. Dissolve a suitable amount of the material with 50% of the flask volume of acetonitrile in an appropriate volumetric flask. Sonicate until completely dissolved. Dilute with water to volume.

Sample solution: 0.1 mg/mL of Oxymetholone, prepared as directed in the *Standard solution*

Chromatographic system

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

Mode: LC

Detector: UV 280 nm

Column: 4.6-mm × 25-cm; 5-µm packing L1

Flow rate: 1.2 mL/min

Injection volume: 20 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 1.5

Relative standard deviation: NMT 0.73%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of oxymetholone ($C_{21}H_{32}O_3$) in the portion of Oxymetholone taken:

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

r_U = peak response from the *Sample solution*

r_S = peak response from the *Standard solution*

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

C_U = concentration of Oxymetholone in the *Sample solution* (mg/mL)▲ (USP 1-May-2021)

Acceptance criteria: 97.0%–103.0% on the dried basis

Add the following:

▲IMPURITIES

• **Organic Impurities**

[Note—Protect solutions containing oxymetholone from light.]

System suitability solution: 0.1 mg/mL of USP Oxymetholone RS and 0.02 mg/mL of USP Oxymetholone Related Compound B RS in toluene

Sensitivity solution: 0.001 mg/mL of USP Oxymetholone Related Compound B RS in toluene

Standard solution: 0.01 mg/mL of USP Oxymetholone RS in toluene

Sample solution: 1.0 mg/mL of Oxymetholone in toluene

Chromatographic system

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

Mode: GC

Detector: Flame ionization

Column: 0.32-mm × 30-m capillary; coated with a 0.25-µm film of phase G27

Temperatures

Injection port: 240°

Detector: 325°

Column: See *Table 1*.

Table 1

Initial Temperature (°)	Temperature Ramp (°/min)	Final Temperature (°)	Hold Time at Final Temperature (min)
200	2	270	5

Carrier gas: Helium

Flow rate: 1.5 mL/min

Injection volume: 2 µL

Injection type: Split ratio, 5:1

[Note—The use of a deactivated inlet liner is recommended.]

System suitability

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

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

Suitability requirements

Resolution: NLT 2.0 between oxymetholone and oxymetholone related compound B, *System suitability solution*

Tailing factor: NMT 1.2 for oxymetholone, *Standard solution*

Signal-to-noise ratio: NLT 10 for oxymetholone related compound B, *Sensitivity solution*

Analysis

Sample: *Sample solution*

Calculate the percentage of each impurity in the portion of Oxymetholone taken:

$$\text{Result} = (r_U/F_i) \times \{1/[r_T + \Sigma(r_U/F_i)]\} \times 100$$

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

F_i = relative response factor for each corresponding impurity (see *Table 2*)

r_T = peak response of Oxymetholone from the *Sample solution*

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

Table 2

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Dimethylandrostadiol[a]	0.71	1.4	1.0
Mestanolone[b]	0.76	1.4	1.0
Oxymetholone	1.0	—	—
Oxymetholone related compound B	1.1	1.0	1.0
2-Formyl-3-methoxy androstanol[c]	1.2	1.1	1.0
Any individual unspecified impurity	—	1.0	0.5
Total impurities	—	—	2.0

[a] 3α,17α-Dimethyl-5α-androstan-3β,17β-diol.

[b] 17β-Hydroxy-17α-methyl-5α-androstan-3-one.

[c] 2-Formyl-3-methoxy-17α-methyl-5α-androsta-2-en-17β-ol.

▲ (USP 1-May-2021)

SPECIFIC TESTS

Delete the following:

▲• **Melting Range or Temperature** ⟨741⟩**:** 172°–180°▲ (USP 1-May-2021)

• **Optical Rotation** ⟨781S⟩**,** *Procedures, Specific Rotation*

Sample solution: 20 mg/mL in dioxane

Acceptance criteria: +34° to +38°

• **Loss on Drying** ⟨731⟩

Analysis: Dry under vacuum over phosphorus pentoxide for 4 h.

Acceptance criteria: NMT 1.0%

Delete the following:

▲• **Completeness of Solution**

Sample solution: 20 mg/mL in dioxane

Acceptance criteria: The solution is clear and free from undissolved solid.▲ (USP 1-May-2021)

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers.

Change to read:

• **USP REFERENCE STANDARDS** ⟨11⟩

USP Oxymetholone RS

▲ USP Oxymetholone Related Compound B RS

17β-Hydroxy-1-hydroxymethylene-17α-methyl-5α-androstan-3-one.

$C_{21}H_{32}O_3$ 332.48▲ (USP 1-May-2021)

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

Topic/Question	Contact	Expert Committee
OXYMETHOLONE	Documentary Standards Support	SM52020 Small Molecules 5
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM52020 Small Molecules 5

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. 49(6)

Current DocID: GUID-18FB929B-2D34-4326-9078-9342B94E5B77_3_en-US

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