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Methylprednisolone Acetate

$C_{24}H_{32}O_6$ 416.51

Pregna-1,4-diene-3,20-dione, 21-(acetyloxy)-11,17-dihydroxy-6-methyl-, (6α,11β)-;

11β,17,21-Trihydroxy-6α-methylpregna-1,4-diene-3,20-dione 21-acetate CAS RN®: 53-36-1; UNII: 43502P7F0P.

DEFINITION

Methylprednisolone Acetate contains NLT 97.0% and NMT 103.0% of methylprednisolone acetate ($C_{24}H_{32}O_6$), calculated on the dried basis.

IDENTIFICATION

Change to read:

• **A.** ▲**Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*: 197K**▲ (CN 1-May-2020)

Change to read:

• **B.** ▲**Spectroscopic Identification Tests ⟨197⟩, *Ultraviolet-Visible Spectroscopy*: 197U**▲ (CN 1-May-2020)

Analytical wavelength: 243 nm

Standard solution: 10 µg/mL of USP Methylprednisolone Acetate RS in alcohol

Sample solution: 10 µg/mL of methylprednisolone acetate in alcohol

Acceptance criteria: Absorptivities, calculated on the dried basis, do not differ by more than 3.0%.

ASSAY

• **Procedure**

Mobile phase: *n*-Butyl chloride, water-saturated *n*-butyl chloride, tetrahydrofuran, methanol, and glacial acetic acid (95:95:14:7:6)

Internal standard solution: 6 mg/mL of prednisone prepared as follows. Transfer an appropriate amount of prednisone to a suitable volumetric flask. Add 3% of the flask volume of glacial acetic acid, and sonicate. Dilute with chloroform to volume, slowly adding the chloroform. Sonicate, and shake to dissolve.

Standard solution: 0.2 mg/mL of USP Methylprednisolone Acetate RS prepared as follows. Transfer an appropriate amount of USP Methylprednisolone Acetate RS to a suitable volumetric flask, and add 5% of the flask volume of the *Internal standard solution*. Dilute with chloroform to volume, and shake to dissolve.

Sample solution: 0.2 mg/mL of Methylprednisolone Acetate prepared as follows. Transfer an appropriate amount of methylprednisolone acetate to a suitable volumetric flask, and add 5% of the flask volume of the *Internal standard solution*. Dilute with chloroform to volume, and shake to dissolve.

Chromatographic system

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

Mode: LC

Detector: UV 254 nm

Column: 4-mm × 25-cm; packing L3

Flow rate: 1 mL/min

Injection volume: 10 µL

System suitability

Sample: *Standard solution*

[Note—The relative retention times for methylprednisolone acetate and prednisone are about 1.0 and 1.3, respectively.]

Suitability requirements

Resolution: NLT 2.5 between methylprednisolone acetate and prednisone

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of methylprednisolone acetate ($C_{24}H_{32}O_6$) in the portion of Methylprednisolone Acetate taken:

$$\text{Result} = (R_U/R_S) \times (C_S/C_U) \times 100$$

R_U = peak height ratio of methylprednisolone acetate to prednisone from the *Sample solution*

R_S = peak height ratio of methylprednisolone acetate to prednisone from the *Standard solution*

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

C_U = concentration of Methylprednisolone Acetate in the *Sample solution* (mg/mL)

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

IMPURITIES

• **Residue on Ignition ⟨281⟩:** NMT 0.2%

• **Organic Impurities**

Mobile phase: Tetrahydrofuran and water (51:149)

Diluent: Tetrahydrofuran, acetonitrile, glacial acetic acid, and water (250:250:1:499)

Standard solution: 20 µg/mL of USP Methylprednisolone Acetate RS in *Diluent.* Sonicate, if necessary, to dissolve.

Sample solution: 1 mg/mL of Methylprednisolone Acetate in *Diluent.* Sonicate, if necessary, to dissolve.

Chromatographic system

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

Mode: LC

Detector: UV 254 nm

Column: 4.6-mm × 25-cm; packing L1

Flow rate: 1 mL/min

Injection volume: 20 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Relative standard deviation: NMT 5.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of each impurity in the portion of Methylprednisolone Acetate taken:

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

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

r_S = peak response for methylprednisolone acetate from the *Standard solution*

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

C_U = concentration of Methylprednisolone Acetate in the *Sample solution* (mg/mL)

Acceptance criteria

Any individual impurity: NMT 1.0%

Total impurities: NMT 2.0%

SPECIFIC TESTS

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

Sample solution: 10 mg/mL in dioxane

Acceptance criteria: +97° to +105°

• **Loss on Drying ⟨731⟩**

Analysis: Dry at 105° for 3 h.

Acceptance criteria: NMT 1.0%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight, light-resistant containers. Store at 25°, excursions permitted between 15° and 30°.

• **USP Reference Standards ⟨11⟩**

USP Methylprednisolone Acetate RS

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

Topic/Question	Contact	Expert Committee
METHYLPREDNISOLONE ACETATE	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:
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