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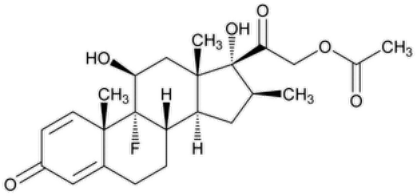
Betamethasone Acetate

Add the following:

▲



▲ (USP 1-Dec-2023)

$C_{24}H_{31}FO_6$ 434.50

Pregna-1,4-diene-3,20-dione, 9-fluoro-11,17-dihydroxy-16-methyl-21-(acetyloxy)-, (11β,16β)-;

9-Fluoro-11β,17,21-trihydroxy-16β-methylpregna-1,4-diene-3,20-dione 21-acetate CAS RN®: 987-24-6; UNII: TI05AO53L7.

DEFINITION

Betamethasone Acetate contains NLT 97.0% and NMT 103.0% of betamethasone acetate ($C_{24}H_{31}FO_6$), calculated on the anhydrous basis.

IDENTIFICATION

Change to read:

• **A. Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*:** 197M ▲or 197A▲ (USP 1-Dec-2023)

Change to read:

• **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-Dec-2023)

ASSAY

Change to read:

• **Procedure**

▲**Solution A:** Water

Solution B: Acetonitrile

Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution A (%)	Solution B (%)
0.0	61	39
10.0	61	39
12.0	50	50
17.0	50	50
17.1	61	39
22.0	61	39

Diluent: *Solution A* and *Solution B* (44:56)

System suitability solution: 200 µg/mL of USP Betamethasone Acetate RS and 40 µg/mL each of USP Betamethasone Acetate Related Compound C RS, USP Betamethasone Acetate Related Compound D RS, and USP Dexamethasone Acetate RS in *Diluent*. Sonicate to dissolve, if necessary.

Standard solution: 200 µg/mL of USP Betamethasone Acetate RS in *Diluent*. Sonicate to dissolve, if necessary.

Sample solution: 200 µg/mL of Betamethasone Acetate in *Diluent*. Sonicate to dissolve, if necessary.

Chromatographic system

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

Mode: LC

Detector: UV 240 nm

Column: 4.6-mm × 15-cm; 3.5-µm packing L1

Autosampler temperature: 4°

Flow rate: 0.8 mL/min

Injection volume: 15 µL

System suitability

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

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

Suitability requirements

Resolution: NLT 3.0 between betamethasone acetate and dexamethasone acetate; NLT 1.2 between betamethasone acetate related compound C and betamethasone acetate related compound D, *System suitability solution*

Tailing factor: NMT 1.5, *Standard solution*

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

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of betamethasone acetate ($C_{24}H_{31}FO_6$) in the portion of Betamethasone Acetate taken:

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

r_U = peak response of betamethasone acetate from the *Sample solution*

r_S = peak response of betamethasone acetate from the *Standard solution*

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

C_U = concentration of Betamethasone Acetate in the *Sample solution* (µg/mL)

▲ (USP 1-Dec-2023)

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

IMPURITIES

• **RESIDUE ON IGNITION ⟨281⟩:** NMT 0.2%, a platinum crucible being used

Delete the following:

▲• **ORDINARY IMPURITIES ⟨466⟩**▲ (USP 1-DEC-2023)

Add the following:

▲• **ORGANIC IMPURITIES**

Solution A, Solution B, Mobile phase, Diluent, System suitability solution, Sample solution, and **Chromatographic system:** Proceed as directed in the *Assay*.

Standard solution: 0.2 µg/mL each of USP Betamethasone Acetate RS, USP Betamethasone RS, and USP Betamethasone Acetate Related Compound D RS, and 0.3 µg/mL each of USP Betamethasone Acetate Related Compound C RS and USP Dexamethasone Acetate RS in *Diluent*. Sonicate to dissolve, if necessary.

Sensitivity solution: 0.1 µg/mL of USP Betamethasone Acetate RS in *Diluent*. Sonicate to dissolve, if necessary.

System suitability

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

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

Suitability requirements

Resolution: NLT 3.0 between betamethasone acetate and dexamethasone acetate; NLT 1.2 between betamethasone acetate related compound C and betamethasone acetate related compound D, *System suitability solution*

Relative standard deviation: NMT 5.0% for all standard peaks, *Standard solution*

Signal-to-noise ratio: NLT 10, *Sensitivity solution*

Analysis

Samples: *Sample solution* and *Standard solution*

Calculate the percentage of betamethasone, betamethasone related compound C, betamethasone related compound D, and dexamethasone acetate in the portion of Betamethasone Acetate taken:

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

r_U = peak response of betamethasone, betamethasone related compound C, betamethasone related compound D, or dexamethasone acetate from the *Sample solution*

r_S = peak response of betamethasone, betamethasone related compound C, betamethasone related compound D, or dexamethasone acetate from the *Standard solution*

C_S = concentration of the corresponding USP Reference Standard in the *Standard solution* (µg/mL)

C_U = concentration of Betamethasone Acetate in the *Sample solution* (µg/mL)

Calculate the percentage of isoflupredone acetate, 11-desoxymeprednisone, and each unspecified impurity in the portion of Betamethasone Acetate taken:

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

r_U = peak response of isoflupredone acetate, 11-desoxymeprednisone, or any unspecified impurity from the *Sample solution*

r_S = peak response of betamethasone acetate from the *Standard solution*

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

C_U = concentration of Betamethasone Acetate in the *Sample solution* (µg/mL)

Acceptance criteria: See *Table 2*. The reporting threshold is 0.05%.

Table 2

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Betamethasone	0.38	0.15
Isoflupredone acetate[a]	0.66	0.15
11-Desoxymeprednisone[b]	0.79	0.15
Betamethasone acetate	1.00	—
Dexamethasone acetate	1.06	0.10
Betamethasone acetate related compound C	1.16	0.15
Betamethasone acetate related compound D	1.2	0.10
Any individual unspecified impurity	—	0.10
Total impurities	—	1.25

[a] 9-Fluoro-11β,17,21-trihydroxypregna-1,4-diene-3,20-dione 21-acetate.

[b] 17,21-Dihydroxy-16β-methylpregna-1,4-diene-3,20-dione.

▲ (USP 1-Dec-2023)

SPECIFIC TESTS

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

Sample solution: 10 mg/mL of Betamethasone Acetate in dioxane

Acceptance criteria: +120° to +128°

• **Water Determination** ⟨921⟩, *Method I*: NMT 4.0%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight containers. Store between 2° and 30°.

Change to read:

• **USP Reference Standards** ⟨11⟩

▲ USP Betamethasone RS▲ (USP 1-Dec-2023)

USP Betamethasone Acetate RS

▲ USP Betamethasone Acetate Related Compound C RS

9-Fluoro-11β,17,21-trihydroxy-16β-methylpregna-1,4-diene-3,20-dione 11,21-diacetate.

$C_{26}H_{33}FO_7$ 476.53

USP Betamethasone Acetate Related Compound D RS

9,11β-Epoxy-17,21-dihydroxy-16β-methylpregna-1,4-diene-3,20-dione 21-acetate.

$C_{24}H_{30}O_6$ 414.49

USP Dexamethasone Acetate RS▲ (USP 1-Dec-2023)

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

Topic/Question	Contact	Expert Committee
BETAMETHASONE ACETATE	Documentary Standards Support	SM52020 Small Molecules 5

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. 46(6)

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