Dexamethasone Sodium Phosphate Ophthalmic Ointment

DEFINITION

Dexamethasone Sodium Phosphate Ophthalmic Ointment is a sterile ointment containing an amount of dexamethasone sodium phosphate ($C_{22}H_{28}FNa_2O_8P$) equivalent to NLT 90.0% and NMT 115.0% of the labeled amount of dexamethasone phosphate ($C_{22}H_{30}FO_8P$).

IDENTIFICATION

- **A. THIN-LAYER CHROMATOGRAPHY**

Solution A: Dissolve 3.1 g of boric acid, 203 mg of magnesium chloride, and 860 mg of sodium hydroxide in water to make 1000 mL.

Solution B: 1 mg/mL of alkaline phosphatase enzyme in *Solution A*

Standard solution: 300 µg/mL of USP Dexamethasone RS in methylene chloride

Sample solution: Transfer 5 mL of the *Sample solution* obtained in the *Assay* to a 50-mL glass-stoppered tube. Add 5 mL of *Solution B*, incubate at 37° for 45 min, then add 25 mL of methylene chloride, and shake for 2 min. Evaporate 15 mL of the methylene chloride extract on a steam bath to dryness. Dissolve the residue in 1 mL of methylene chloride.

Chromatographic system
(See *Chromatography* ⟨621⟩*, Thin-Layer Chromatography*.)

Adsorbent: 0.25-mm layer of chromatographic silica gel (20- × 20-cm plate)

Application volume: 5 µL

Developing solvent system: Chloroform, acetone, and water (50:50:1)

Spray reagent: Dilute sulfuric acid (1 in 2)

Analysis

Samples: *Standard solution* and *Sample solution*

Allow the spots to dry, and develop the chromatogram in a tank completely lined with a strip of filter paper, using the *Developing solvent system*, until the solvent front has moved about three-fourths of the length of the plate. Remove the plate from the developing tank, mark the solvent front, and allow the spots to dry. Spray the plate with *Spray reagent*, and heat at 105° until brown or black spots appear.

Acceptance criteria: The R_F value of the principal spot of the *Sample solution* corresponds to that of the *Standard solution*.

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*.• (IRA 1-May-2015)

ASSAY

Change to read:

- **PROCEDURE**

Buffer: 6.9 g/L of monobasic sodium phosphate in water

Mobile phase: Methanol and *Buffer* (52:48)

Diluent: Dissolve 0.29 g of dibasic sodium phosphate in 450 mL of water, and add 550 mL of alcohol.

Standard solution: •33 µg/mL of freshly prepared USP Dexamethasone Sodium Phosphate RS in *Solution A*• (IRA 1-May-2015)

Sample solution: Nominally 30 µg/mL of dexamethasone phosphate prepared as follows. Transfer a portion of Ophthalmic Ointment, equivalent to 3 mg of dexamethasone phosphate, to a 150-mL beaker. Add 65 mL of *Diluent*, and heat just to boiling. Pour the contents of the beaker into a 125-mL separator containing 45 mL of isooctane. After shaking for 1 min, decant the lower layer into a 100-mL volumetric flask with the aid of a glass funnel. Rinse the 150-mL beaker with two 15-mL portions of *Diluent*, extracting the remaining isooctane in the separator with each portion, and decanting the lower layer from each extraction into the 100-mL volumetric flask. Dilute with *Diluent* to volume, and pass through a membrane filter.

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

Mode: LC

Detector: UV 254 nm

Column: 4-mm × 30-cm; packing L1

Flow rate: 1.5 mL/min

Injection volume: 20 µL

System suitability

Sample: *Standard solution*

[NOTE—The retention time for dexamethasone phosphate is about 8.5 min.]

Suitability requirements

Relative standard deviation: NMT 1.5%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of dexamethasone phosphate ($C_{22}H_{30}FO_8P$) in the portion of Ophthalmic Ointment taken:

$$\text{•Result} = (r_U/r_S) \times (C_S/C_U) \times (M_{r1}/M_{r2}) \times 100\text{•}$$ (IRA 1-May-2015)

r_U = peak response from the *Sample solution*
r_S = peak response from the *Standard solution*
C_S = concentration of •USP Dexamethasone Sodium Phosphate RS• (IRA 1-May-2015) in the *Standard solution* (µg/mL)
C_U = nominal concentration of dexamethasone phosphate in the *Sample solution* (µg/mL)
M_{r1} = molecular weight of dexamethasone phosphate, 472.44
M_{r2} = molecular weight of dexamethasone sodium phosphate, 516.40• (IRA 1-May-2015)

Acceptance criteria: 90.0%–115.0%

PERFORMANCE TESTS

- **MINIMUM FILL** ⟨**755**⟩**:** Meets the requirements

SPECIFIC TESTS

- **METAL PARTICLES IN OPHTHALMIC OINTMENTS** ⟨**751**⟩**:** Meets the requirements
- **STERILITY TESTS** ⟨**71**⟩**:** Meets the requirements

ADDITIONAL REQUIREMENTS

Change to read:

- **PACKAGING AND STORAGE:** Preserve in collapsible ophthalmic ointment tubes. •Store between 8° and 27°.• (IRA 1-May-2015)

Change to read:

- **USP REFERENCE STANDARDS** ⟨**11**⟩

USP Dexamethasone RS

•USP Dexamethasone Sodium Phosphate RS• (IRA 1-May-2015)