Edition: BP 2025 (Ph. Eur. 11.6 update)

Prednisolone Sodium Phosphate Eye Drops

General Notices

Action and use

Glucocorticoid.

DEFINITION

Prednisolone Sodium Phosphate Eye Drops are a sterile solution of Prednisolone Sodium Phosphate in Purified Water.

The eye drops comply with the requirements stated under Eye Preparations and with the following requirements.

Content of prednisolone sodium phosphate, $C_{21}H_{27}Na_2O_8P$

90.0 to 110.0% of the stated amount.

IDENTIFICATION

For eye drops containing less than 0.1% w/v of Prednisolone Sodium Phosphate carry out test B only.

A. Carry out the method for *thin-layer chromatography*, Appendix III A, using *silica gel* GF_{254} as the coating substance and a mixture of 33 volumes of *water*, 47 volumes of *glacial acetic acid* and 120 volumes of *butan-1-ol*, prepared immediately before use, as the mobile phase. Apply separately to the plate 10 µL of each of the following solutions. For solution (1) use the eye drops diluted, if necessary, with *water* to contain 0.1% w/v of Prednisolone Sodium Phosphate. Solution (2) contains 0.1% w/v of *prednisolone sodium phosphate BPCRS* in *water*. Solution (3) is a mixture of equal volumes of solutions (1) and (2). Solution (4) is a mixture of equal volumes of solution (2) and a 0.1% w/v solution of *betamethasone sodium phosphate BPCRS* in *water*. After removal of the plate, allow it to dry in air, heat at 110° for 10 minutes and examine under *ultraviolet light (254 nm)*. The chromatograms obtained with solutions (1), (2) and (3) show single principal spots with similar Rf values. The chromatogram obtained with solution (4) shows two principal spots with almost identical Rf values.
B. In the Assay, the chromatogram obtained with solution (1) shows a peak with the same retention time as the peak due to prednisolone sodium phosphate in the chromatogram obtained with solution (2).
C. To a volume containing 0.2 mg of Prednisolone Sodium Phosphate slowly add 1 mL of *sulfuric acid* and allow to stand for 2 minutes. A deep red colour is produced.

TESTS

Acidity or alkalinity

pH, 7.0 to 8.5, Appendix V L.

Free prednisolone

Carry out the method for *liquid chromatography*, Appendix III D. For eye drops containing 0.010% w/v or more of Prednisolone Sodium Phosphate use 50 µL of the following solutions. Solution (1) contains 0.00040% w/v of *prednisolone BPCRS* in the mobile phase. Prepare solution (2) in the following manner. Dilute the eye drops, if necessary, with the mobile phase to produce a solution containing 0.010% w/v of Prednisolone Sodium Phosphate.

For eye drops containing less than 0.010% w/v of Prednisolone Sodium Phosphate, use 0.2 mL of the following solutions. Solution (1) contains 0.00004% w/v of *prednisolone BPCRS* in the mobile phase. For solution (2) dilute the eye drops, if necessary, with the mobile phase to produce a solution containing 0.0010% w/v of Prednisolone Sodium Phosphate.

The chromatographic procedure may be carried out using (a) a stainless steel column (20 cm × 4.6 mm) packed with *octadecylsilyl silica gel for chromatography* (10 µm) (Spherisorb ODS 1 is suitable), (b) a mixture of 45 volumes of *methanol* and 55 volumes of *citro-phosphate buffer pH 5.0* as the mobile phase with a flow rate of 2 mL per minute and (c) a detection wavelength of 247 nm.

In the chromatogram obtained with solution (2) the area of any peak corresponding to prednisolone is not greater than the area of the principal peak in the chromatogram obtained with solution (1) (4%).

ASSAY

Carry out the method for *liquid chromatography*, Appendix III D, using 50 µL of the following solutions. For solution (1) dilute a quantity of the eye drops, if necessary, to contain 0.001% w/v of Prednisolone Sodium Phosphate. For solution (2) dissolve 10 mg of *prednisolone sodium phosphate BPCRS* in sufficient *water* to produce 100 mL (solution A) and dilute 10 mL of the solution to 100 mL. For solution (3) add 10 mL of a 0.01% w/v solution of *betamethasone sodium phosphate BPCRS* in *water* to 10 mL of solution A and dilute to 100 mL with *water*.

The chromatographic procedure may be carried out using (a) a stainless steel column (20 cm × 4.6 mm) packed with *octadecylsilyl silica gel for chromatography* (10 µm) (Spherisorb ODS 1 is suitable), (b) a mixture of 45 volumes of *methanol* and 55 volumes of *citro-phosphate buffer pH 5.0* as the mobile phase with a flow rate of 2 mL per minute and (c) a detection wavelength of 247 nm.

The assay is not valid unless the *resolution factor* between the peaks due to betamethasone sodium phosphate and prednisolone sodium phosphate in the chromatogram obtained with solution (3) is at least 2.5.

Calculate the content of $C_{21}H_{27}Na_2O_8P$ in solution A by measuring the *absorbance*, Appendix II B, of a solution obtained by diluting 1 volume of solution A to 4 volumes with *water* at the maximum at 247 nm and taking 312 as the value of A(1%, 1 cm) at the maximum at 247 nm. Calculate the content of $C_{21}H_{27}Na_2O_8P$ in the eye drops using peak areas.

STORAGE

Prednisolone Sodium Phosphate Eye Drops should be stored protected from light.