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

Dexamethasone Sodium Phosphate Injection

General Notices

Action and use

Glucocorticoid.

DEFINITION

Dexamethasone Sodium Phosphate Injection is a sterile solution of Dexamethasone Sodium Phosphate in Water for Injections.

The injection complies with the requirements stated under Parenteral Preparations and with the following requirements.

Content of dexamethasone, $C_{22}H_{29}FO_5$

95.0 to 105.0% of the stated amount.

CHARACTERISTICS

A clear, colourless solution.

IDENTIFICATION

A. Carry out the method for *thin-layer chromatography*, Appendix III A, using the following solutions in *methanol*.
(1) Dilute, if necessary, a volume of the injection to contain the equivalent of 0.08% w/v of dexamethasone.
(2) 0.1% w/v of *dexamethasone sodium phosphate BPCRS*.
(3) 0.1% w/v each of *dexamethasone sodium phosphate BPCRS* and *prednisolone sodium phosphate BPCRS*.

CHROMATOGRAPHIC CONDITIONS

(a) Use as the coating *silica gel F_{254}* (Merck plates are suitable).
(b) Use the mobile phase as described below.
(c) Apply 5 µL of each solution.
(d) Develop the plate to 15 cm.
(e) After removal of the plate, dry in air, heat at 110° for 10 minutes, spray the hot plate with *ethanolic sulfuric acid (20%)* and heat at 120° for 10 minutes; cool and examine in daylight and under *ultraviolet light (365 nm)*.

MOBILE PHASE

20 volumes of *acetic acid*, 20 volumes of *water* and 60 volumes of *butan-1-ol*.

SYSTEM SUITABILITY

The test is not valid unless the chromatogram obtained with solution (3) shows two spots which may, however, not be completely separated.

CONFIRMATION

The principal spot in the chromatogram obtained with solution (1) is similar in position, colour in daylight, fluorescence in ultraviolet light at 365 nm and size to that in the chromatogram obtained with solution (2).

B. In the Assay, the chromatogram obtained with solution (1) shows a peak with the same retention time as the principal peak in the chromatogram obtained with solution (2).

TESTS

Alkalinity

pH, 7.0 to 8.5, Appendix V L.

Related substances

Carry out the method for *liquid chromatography*, Appendix III D, using the following solutions in mobile phase A.

(1) Dilute a volume of the injection to produce a solution containing the equivalent of 0.08% w/v of dexamethasone.
(2) Dilute 1 volume of solution (1) to 200 volumes.
(3) 0.01% w/v each of *dexamethasone sodium phosphate BPCRS* and *betamethasone sodium phosphate BPCRS*.
(4) 0.1% w/v of *dexamethasone sodium phosphate for peak identification EPCRS*.
(5) Dilute 1 volume of solution (2) to 5 volumes.

CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (12.5 cm × 4.6 mm) packed with *end-capped octylsilyl silica gel for chromatography R* (5 µm) (Kromasil C8 is suitable).
(b) Use gradient elution and the mobile phase described below.
(c) Use a flow rate of 1 mL per minute.
(d) Use a column temperature of 30°.
(e) Use a detection wavelength of 254 nm.
(f) Inject 20 µL of each solution.
(g) For solution (1), continue the chromatography for twice the retention time of the principal peak.

MOBILE PHASE

Mobile phase A 300 volumes of 0.09M *ammonium acetate* and 350 volumes of water, adjusted to pH 3.8 with *acetic acid*, then add 350 volumes of *methanol*.

Mobile phase B 300 volumes of 0.09M *ammonium acetate*, adjusted to pH 4.0 with *acetic acid*, and 700 volumes of *methanol*.

Time (Minutes)	Mobile phase A (% v/v)	Mobile phase B (% v/v)	Comment
0-3.5	90	10	isocratic
3.50-23.5	90→60	10→40	linear gradient
23.5-34.5	60→5	40→95	linear gradient
34.5-50	5	95	isocratic
50-55	5→90	95→10	linear gradient
55-65	90	10	re-equilibration

When the chromatograms are recorded under the prescribed conditions the retention times relative to dexamethasone sodium phosphate (retention time about 22 minutes) are impurity 1, about 0.1; impurity C, about 0.5; impurity D, about 0.6; impurity E, about 0.8; impurity F, about 0.92; impurity B, about 0.95; impurity A, about 1.37 and impurity G, about 1.41.

SYSTEM SUITABILITY

The test is not valid unless, in the chromatogram obtained with solution (3), the *resolution* between the peaks due to betamethasone sodium phosphate and dexamethasone sodium phosphate is at least 2.0.

LIMITS

Identify any peak corresponding to impurity A in the chromatogram obtained with solution (1) using the chromatogram obtained with solution (4) and multiply the area by a correction factor of 0.75.

In the chromatogram obtained with solution (1):

the areas of any peak corresponding to impurity A, impurity B, impurity C, impurity D, impurity E, impurity F or impurity G are not greater than the area of the principal peak in the chromatogram obtained with solution (2) (0.5% of each);

the area of any other *secondary peak* is not greater than 0.4 times the area of the principal peak in the chromatogram obtained with solution (2) (0.2%).

the sum of the areas of any *secondary peaks* is not greater than 6 times the area of the principal peak in the chromatogram obtained with solution (2) (3%).

Disregard any peak with an area less than the area of the principal peak in the chromatogram obtained with solution (5) (0.1%).

ASSAY

Carry out the method for *liquid chromatography*, Appendix III D, using the following solutions in the mobile phase.

(1) Dilute a volume of the injection to produce a solution containing the equivalent of 0.0066% w/v of dexamethasone.
(2) 0.009% w/v of *dexamethasone sodium phosphate BPCRS*.
(3) 0.002% w/v each of *dexamethasone sodium phosphate BPCRS* and *betamethasone sodium phosphate BPCRS*.

CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (25 cm × 4.6 mm) packed with *octadecylsilyl silica gel for chromatography R* (5 µm) (Hypersil ODS is suitable).
(b) Use isocratic elution and the mobile phase described below.
(c) Use a flow rate of 1 mL per minute.
(d) Use an ambient column temperature.
(e) Use a detection wavelength of 254 nm.
(f) Inject 20 µL of each solution.

MOBILE PHASE

To 1.360 g of *potassium dihydrogen phosphate* add 0.600 g of *hexylamine*, mix, allow to stand for 10 minutes, dissolve in 182.5 mL of *water*, add 67.5 mL of *acetonitrile*, mix and filter (0.45 µm).

SYSTEM SUITABILITY

The test is not valid unless, in the chromatogram obtained with solution (3), the *resolution* between the peaks due to betamethasone sodium phosphate and dexamethasone sodium phosphate is at least 2.2.

DETERMINATION OF CONTENT

Calculate the content of $C_{22}H_{29}FO_5$ in the injection from the peak areas obtained and from the declared content of $C_{22}H_{28}FNa_2O_8P$ in *dexamethasone sodium phosphate BPCRS*. 1 mg of $C_{22}H_{28}FNa_2O_8P$ is equivalent to 0.760 mg of $C_{22}H_{29}FO_5$.

STORAGE

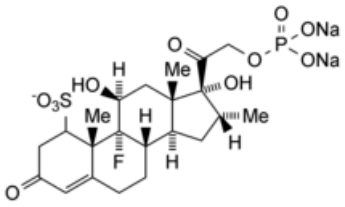
Dexamethasone Sodium Phosphate Injection should be protected from light. It should not be allowed to freeze.

LABELLING

The content of active ingredient is stated as the equivalent amount of dexamethasone in a suitable dose-volume.

IMPURITIES

The impurities limited by the requirements of this monograph those listed under Dexamethasone Sodium Phosphate and:



1. disodium 9-fluoro-11β,17-dihydroxy-16α-methyl-3-oxo-1ζ-sulfopregn-4-ene-21-yl phosphate (Sulfite adduct).