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

Gentamicin Injection

General Notices

Action and use

Aminoglycoside antibacterial.

DEFINITION

Gentamicin Injection is a sterile solution of Gentamicin Sulfate in Water for Injections.

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

IDENTIFICATION

A. Carry out the method for *thin-layer chromatography*, Appendix III A, using the following solutions.
(1) Dilute a volume of the injection, if necessary, with sufficient *water* to produce a solution containing the equivalent of 0.5% w/v of gentamicin.
(2) 0.8% w/v of *gentamicin sulfate BPCRS* in *water*.

CHROMATOGRAPHIC CONDITIONS

(a) Use as the coating silica gel (Merck silica gel 60 plates are suitable).
(b) Use the mobile phase as described below.
(c) Apply 6 µL of each solution.
(d) Develop the plate to 15 cm.
(e) After removal of the plate, allow it to dry in air, spray with *ninhydrin solution R1* and heat at 105° for 2 minutes.

MOBILE PHASE

The lower layer obtained by shaking together equal volumes of 13.5M *ammonia*, *chloroform* and *methanol* and allowing to separate.

CONFIRMATION

The three principal spots in the chromatogram obtained with solution (1) correspond to the three principal spots in the chromatogram obtained with solution (2).

B. In the test for Composition of gentamicin sulfate, the retention times of the four principal peaks in the chromatogram obtained with solution (1) correspond to those of the four principal peaks in the chromatogram obtained with solution (2).

TESTS

Acidity

pH, 3.0 to 5.5, Appendix V L.

Composition of gentamicin sulfate

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

(1) Add 5 mL of *methanol* to 10 mL of a solution prepared by diluting a suitable volume of the injection with *water* to contain the equivalent of 0.045% w/v of gentamicin. Swirl and add 4 mL of *phthalaldehyde reagent*, mix and add sufficient *methanol* to produce 25 mL, heat in a water bath at 60° for 15 minutes and cool. If the solution is not used immediately, cool to 0° and use within 4 hours.
(2) Prepare in the same manner as solution (1) but using 10 mL of a 0.065% w/v solution of *gentamicin sulfate BPCRS* in place of 10 mL of the preparation being examined.

CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (12.5 cm × 4.6 mm) packed with *end-capped octadecylsilyl silica gel for chromatography* (5 µm) (Hypersil ODS and Kromasil C18 are suitable).
(b) Use isocratic elution and the mobile phase described below.
(c) Use a flow rate of 1.5 mL per minute.
(d) Use an ambient column temperature.
(e) Use a detection wavelength of 330 nm.
(f) Inject 20 µL of each solution.

MOBILE PHASE

0.025M *sodium heptanesulfonate monohydrate* in a mixture of 5 volumes of *glacial acetic acid*, 25 volumes of *water* and 70 volumes of *methanol*.

When the chromatograms are recorded under the prescribed conditions the retention time of component C_2 is 10 to 20 minutes. The retention times relative to component C_2 are: about 0.13 (reagent); about 0.27 (component C_1); about 0.65 (component C_{1a}); about 0.85 (component C_{2a}).

SYSTEM SUITABILITY

The test is not valid unless, in the chromatogram obtained with solution (2), the *resolution factor* between the peaks due to components C_{2a} and C_2 is at least 1.3.

LIMITS

Using the chromatogram obtained with solution (1) calculate the percentage content of components C_1, C_{1a}, C_2 and C_{2a} in the injection by *normalisation*. The proportions are within the following limits:

C_1, 25.0 to 50.0%;

C_{1a}, 10.0 to 35.0%;

C_2 plus C_{2a}, 25.0 to 55.0%.

Bacterial endotoxins

Carry out the *test for bacterial endotoxins*, Appendix XIV C. Dilute the injection, if necessary, with *water BET* to give a solution containing the equivalent of 10 mg of gentamicin per mL (solution A). The endotoxin limit concentration of solution A is 7.1 IU per mL.

ASSAY

Carry out the *microbiological assay of antibiotics*, Appendix XIV A. The precision of the assay is such that the fiducial limits of error are not less than 95% and not more than 105% of the estimated potency.

Calculate the content of gentamicin in the injection, taking each 1000 IU found to be equivalent to 1 mg of gentamicin. The upper fiducial limit of error is not less than 97.0% and the lower fiducial limit of error is not more than 110.0% of the stated content.

LABELLING

The strength is stated in terms of the equivalent amount of gentamicin in a suitable dose-volume.