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

Adrenaline Solution / Epinephrine Solution

General Notices

Adrenaline Tartrate Solution
Epinephrine Tartrate Solution

Action and use

Adrenoceptor agonist.

DEFINITION

Adrenaline Solution is an isotonic *cutaneous solution* containing 0.18% w/v of Adrenaline Acid Tartrate with a suitable combination of an antioxidant and an antimicrobial preservative in Purified Water.

The solution complies with the requirements stated under Liquids for Cutaneous Application and with the following requirements. Where appropriate, the solution also complies with the requirements stated under Unlicensed Medicine.

Content of adrenaline, $C_9H_{13}NO_3$

0.09 to 0.11% w/v.

CHARACTERISTICS

A clear, colourless solution.

IDENTIFICATION

A. In the Assay, the retention time of the principal peak in the chromatogram obtained with solution (1) is the same as that of the principal peak in the chromatogram obtained with solution (2).
B. To 1 mL add a 0.25% w/v solution of *iron (III) chloride hexahydrate* drop wise until a green colour is produced. On the gradual addition of *sodium hydrogen carbonate solution*, the solution changes first to blue and then to red.
C. To 10 mL add 2 mL of a 10% w/v solution of *disodium hydrogen orthophosphate* and sufficient *iodinated potassium iodide solution* to produce a brown colour. Remove excess iodine by adding 0.1M *sodium thiosulfate* drop wise; a red colour is produced.

TESTS

Acidity

pH, 2.7 to 3.6, Appendix V L.

Noradrenaline

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

(1) The preparation being examined.
(2) 0.0018% w/v of *noradrenaline acid tartrate*.
(3) 0.0018% w/v of *noradrenaline acid tartrate* and 0.0018% w/v of *adrenaline acid tartrate BPCRS*.

CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (10 cm × 4.6 mm) packed with *end-capped octadecylsilyl silica gel for chromatography* (5 µm) (Nucleosil C18 is suitable).
(b) Use isocratic elution and the mobile phase described below.
(c) Use a flow rate of 2 mL per minute.
(d) Use an ambient column temperature.
(e) Use a detection wavelength of 205 nm.
(f) Inject 20 µL of each solution.

MOBILE PHASE

A solution containing 4.0 g of *tetramethylammonium hydrogen sulfate*, 1.1 g of *sodium heptanesulfonate* and 2 mL of 0.1M *disodium edetate* in a mixture of 950 mL of *water* and 50 mL of *methanol*, the pH of the mixture being adjusted to 3.5 with 1M *sodium hydroxide*.

SYSTEM SUITABILITY

The test is not valid unless, in the chromatogram obtained with solution (3), the *resolution* between the two principal peaks is at least 2.0.

LIMITS

In the chromatogram obtained with solution (1):

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

ASSAY

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

(1) Dilute 1 volume of the preparation being examined to 10 volumes.
(2) 0.02% w/v of *adrenaline acid tartrate BPCRS*.
(3) 0.02% w/v of *adrenaline acid tartrate BPCRS* and 0.02% w/v of *noradrenaline acid tartrate*.

CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (10 cm × 4.6 mm) packed with *end-capped octadecylsilyl silica gel for chromatography* (5 µm) (Nucleosil C18 is suitable).
(b) Use isocratic elution and the mobile phase described below.
(c) Use a flow rate of 2 mL per minute.
(d) Use an ambient column temperature.
(e) Use a detection wavelength of 205 nm.
(f) Inject 20 µL of each solution.

MOBILE PHASE

Add 4.0 g of *tetramethylammonium hydrogen sulfate*, 1.1 g of *sodium heptanesulfonate* and 2 mL of 0.1M *disodium edetate* to a mixture of 50 mL of *methanol* and 950 mL of *water* and adjust the pH of the mixture to 3.5 with 1M *sodium hydroxide*.

SYSTEM SUITABILITY

The Assay is not valid unless, in the chromatogram obtained with solution (3), the *resolution* between the two principal peaks is at least 2.0.

DETERMINATION OF CONTENT

Calculate the content of $C_9H_{13}NO_3$ in the preparation being examined using the declared content of $C_9H_{13}NO_3$ in *adrenaline acid tartrate BPCRS*.

STORAGE

Adrenaline Solution should be kept in a well-filled glass container suitable for parenteral preparations, Appendix XIX B, and should be protected from light.

LABELLING

The label states (1) the date after which the solution is not intended to be used; (2) the conditions under which it should be stored.

The quantity of active ingredient is stated in terms of the equivalent amount of adrenaline (epinephrine).

The label indicates the pharmaceutical form as ‘cutaneous solution’.

Adrenaline Solution contains the equivalent of adrenaline (epinephrine), 1 in 1000 (1 mg in 1 mL).

When a solution of adrenaline hydrochloride is prescribed or demanded, a solution complying with the requirements of this monograph may be dispensed or supplied.