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

Dextran 40 Infusion

General Notices

Dextran 40 Injection, Dextran 40 Intravenous Infusion

Action and use

Plasma substitute.

DEFINITION

Dextran 40 Infusion is a sterile solution containing Dextran 40 for Injection in Glucose Infusion or in Sodium Chloride Infusion. It is supplied as a ready-to-use solution.

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

Content of dextrans

9.0 to 11.0% w/v.

CHARACTERISTICS

An almost colourless, slightly viscous solution.

TESTS

Acidity

Titrate 25 mL with *0.01M sodium hydroxide VS* using *phenol red solution* as indicator. Not more than 2.0 mL of *0.01M sodium hydroxide VS* is required to neutralise the solution.

Molecular size

For solutions in Glucose Infusion, before proceeding with tests A, B and C add 4 volumes of *ethanol (96%)*, centrifuge and dissolve the residue in sufficient Sodium Chloride Infusion to restore the original volume.

A. Determine the viscosities, Appendix V H, Method I, at 37°, using a U-tube viscometer (size C) of solutions in *saline solution* containing about 3.5, 2.5, 1.5 and 0.75% w/v of Dextrans, accurately determined. Calculate the viscosity ratio by dividing the time taken for the meniscus to fall from E to F using the liquid being examined by the time taken using *saline solution*. For each solution plot (viscosity ratio – 1.00)/concentration against concentration. The intercept on the viscosity ratio axis of a straight line through the points represents the intrinsic viscosity. The intrinsic viscosity is 0.16 to 0.20.
B. Dilute the solution being examined with *saline solution* to contain 6% w/v of Dextrans. Place 100 mL in each of five stoppered flasks and adjust the temperature to 24.9° to 25.1°. Maintaining this temperature, add slowly with continuous stirring sufficient *absolute ethanol* to produce a faint cloudiness (about 45 mL). To the separate flasks add 0.5, 1.0, 1.5, 2.0 and 2.5 mL of *absolute ethanol*, stopper the flasks and immerse in a water bath at about 35°, shaking occasionally, until clear solutions are obtained. Transfer the flasks to a water bath maintained at 24.9° to 25.1° and allow to stand overnight

or until two clear liquid phases are formed. Discard the supernatant liquids, dissolve separately the syrupy residues in sufficient *saline solution* to produce 25.0 mL, remove the ethanol by evaporation at a pressure of 2 kPa, dilute to 25.0 mL with *water* and determine the *optical rotation*, Appendix V F. From the optical rotations calculate the amounts of dextrans precipitated as described in the Assay. Choose that fraction containing as nearly as possible but not more than 10% of the dextrans present in the infusion and determine its intrinsic viscosity by the method described under test A using a U-tube viscometer (size A). The intrinsic viscosity is not more than 0.27.

C. Place in each of four stoppered flasks 100 mL of the diluted infusion in *saline solution* containing 6% w/v of Dextrans and add slowly, with continuous stirring, 80, 90, 100 and 110 mL respectively of *absolute ethanol*. Stopper the flasks, transfer to a water bath maintained at 24.9° to 25.1° and allow to stand overnight or until two clear liquid phases are formed. Separate the supernatant solutions from the syrupy residues. Remove the ethanol from each supernatant solution separately by evaporation at a pressure of 2 kPa, dialyse in cellophane tubing against *water* to remove sodium chloride, adjust the volume to 25.0 mL with *water*, add sufficient *sodium chloride* to produce solutions containing 0.9% w/v and determine the *optical rotation*, Appendix V F. From the optical rotations calculate the amounts of dextrans present as described in the Assay. Choose that fraction containing as nearly as possible but not more than 10% of the dextrans present in the infusion and determine the intrinsic viscosity by the method in test A above. The intrinsic viscosity is not less than 0.08.

Content of glucose

For solutions in Glucose Infusion, 4.5 to 5.5% w/v, when determined by the following method. Dilute 15 mL to 50 mL with *water*. To 5 mL in a stoppered flask add 25 mL of a buffer solution containing 14.3% w/v of *sodium carbonate* and 4.0% w/v of *potassium iodide* and 25 mL of *0.05M iodine VS*. Stopper the flask, allow to stand for exactly 30 minutes at 20°, add 35 mL of *2M hydrochloric acid* and titrate immediately with 0.1M *sodium thiosulfate VS*. Repeat the operation using 5 mL of *water* beginning at the words ‘add 25 mL...’. The difference between the titrations represents the amount of iodine required to oxidise the glucose. Each mL of *0.05M iodine VS* is equivalent to 9.01 mg of glucose.

Bacterial endotoxins

The endotoxin limit concentration is 1.25 IU per mL, Appendix XIV C.

ASSAY

For solutions in Glucose Infusion

Add 0.05 mL of 5M *ammonia* to the required volume and measure the *optical rotation*, Appendix V F. Calculate the content of dextrans from the expression

$$0.5076(\alpha - 0.528D)$$

where α is the observed angular rotation and *D* is the content of glucose as a percentage w/v determined in the test for Content of glucose.

For solutions in Sodium Chloride Infusion

Measure the *optical rotation*, Appendix V F, and multiply the value obtained by 0.5076.

STORAGE

Dextran 40 Infusion should not be exposed to undue fluctuations of temperature.

LABELLING

The strength is stated as the percentage w/v of dextrans. The label states (1) the name of the solvent; (2) that the infusion should not be used if it is cloudy or if a deposit is present.