Ceftriaxone and Sulbactam for Injection

Ceftriaxone Sodium and Sulbactam Sodium for Injection

Ceftriaxone and Sulbactam for Injection is a sterile material consisting of Ceftriaxone Sodium and Sulbactam Sodium with or without excipients. It is filled in a sealed container.

The injection is constituted by dissolving the contents of the sealed container in the requisite amount of sterile Water for Injections, immediately before use.

The constituted solution complies with the requirements for Clarity of solution and Particulate matter stated under Parenteral Preparations (Injections).

Storage. The constituted solution should be used immediately after preparation but, in any case, within the period recommended by the manufacturer.

Ceftriaxone and Sulbactam for Injection contain ceftriaxone sodium and sulbactam sodium equivalent to not less than 90.0 per cent and not more than 110.0 per cent of the stated amounts of ceftriaxone, $C_{18}H_{18}N_8O_7S_3$ and sulbactam, $C_8H_{10}NO_5S$.

Description. A white to off white powder.

The contents of the sealed container comply with the requirements stated under Parenteral Preparations (Powders for Injection) and with the following requirements.

Usual strengths. Ceftriaxone, 2000 mg and Sulbactam, 1000 mg; Ceftriaxone, 1000 mg and Sulbactam, 500 mg; Ceftriaxone, 500 mg and Sulbactam, 250 mg; Ceftriaxone, 250 mg and Sulbactam, 125 mg; Ceftriaxone, 125 mg and Sulbactam, 62.5 mg;

Identification

In the Assay, the principal peaks in the chromatogram obtained with the test solution correspond to the peaks in the chromatogram obtained with reference solution (c).

Tests

pH (2.4.24). 4.5 to 8.0, determined on 10 per cent w/v solution.

Related substances. Determine by liquid chromatography (2.4.14).

Test solution. Disperse a quantity of the injection containing 30 mg of Ceftriaxone in 60 ml of *water* and dilute to 100.0 ml with *water*.

Reference solution. A 0.03 per cent w/v solution of *ceftriaxone sodium IPRS* in the *water*.

Chromatographic system

- a stainless steel column 25 cm x 4.6 mm, packed with octadecylsilane bonded to porous silica (5 µm) (Such as Inertsil ODS-3V),
- sample temperature: 10°,
- mobile phase: A. a mixture of 95 volumes of a buffer solution prepared by dissolving 6.8 g of *potassium dihydrogen orthophosphate* in 1000 ml of *water*, adjusted to pH 3.0 with *orthophosphoric acid* and 5 volumes of *methanol,*
  B. *methanol,*
- a gradient programme using the conditions given below,
- flow rate: 1.5 ml per minute,
- spectrophotometer set at 254 nm,
- injection volume: 20 µl.

Time (in min.)	Mobile phase A (per cent v/v)	Mobile phase B (per cent v/v)
0	95	5
5	95	5
15	80	20
25	80	20
30	60	40
50	60	40
55	95	5
60	95	5

Inject the reference solution. The test is not valid unless the column efficiency is not less than 5000 theoretical plates and the tailing factor is not more than 2.0.

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Inject the test solution. The area of any secondary peak is not more than 1.0 per cent and the sum of the areas of all secondary peaks is not more than 5.0 per cent, calculated by area normalisation.

Bacterial endotoxins (2.2.3). Not more than 0.2 Endotoxin Unit per mg of ceftriaxone.

Sterility (2.2.11). Complies with the test for sterility.

Assay. Determine by liquid chromatography (2.4.14).

Test solution. Mix the contents of 10 vials. Disperse a quantity of the mixed contents containing 250 mg of Ceftriaxone in 100.0 ml of *water.* Dilute 1.0 ml of the solution to 100.0 ml with the mobile phase.

Reference solution (a). Weigh a suitable quantity of *ceftriaxone sodium IPRS* and dissolve in *water* to obtain a solution containing 0.025 w/v solution of ceftriaxone.

Reference solution (b). Weigh a suitable quantity of *sulbactam sodium IPRS* and dissolve in *water* to obtain a solution containing 0.025 w/v solution of sulbactam.

Reference solution (c). Dilute a suitable volume of reference solution (a) and reference solution (b) with the mobile phase to obtain a solution having the similar concentration to the test solution.

Chromatographic system

- a stainless steel column 25 cm x 4.6 mm, packed with octadecylsilane bonded to porous silica (5 µm),
- mobile phase: a mixture of 75 volumes of a buffer solution prepared by dissolving 6.8 g of *potassium dihydrogen orthophosphate* in 1000 ml of *water*, add 2 ml of *triethylamine* and mix, adjusted to pH 4.5 with *orthophosphoric acid* and 25 volumes of *methanol*,
- flow rate: 1 ml per minute,
- spectrophotometer set at 210 nm,
- injection volume: 20 µl.

Inject reference solution (c). The test is not valid unless the tailing factor is not more than 2.0 for ceftriaxone peak and the relative standard deviation for replicate injections is not more than 2.0 for both the peaks.

Inject reference solution (c) and the test solution.

Calculate the content of $C_{18}H_{18}N_8O_7S_3$ and $C_8H_{10}NO_5S$ in the injection.

Labelling. The label states the strength in terms of equivalent amount of ceftriaxone and sulbactam.

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