Bacitracin (Bacitracinum)

Bacitracin (non-injectable)

Bacitracin, sterile

Chemical name. Bacitracin; CAS Reg. No. 1405-87-4.

Description. A white or pale brownish yellow powder; odourless or with a faint characteristic odour.

Solubility. Freely soluble in water, methanol R and ethanol (~750 g/l) TS; practically insoluble in acetone R and ether R.

Category. Antiinfective drug.

Storage. Bacitracin should be kept in a tightly closed container, protected from light and stored at a temperature between 2° and 8°C. If it is intended for parenteral administration, the container should be sterile and sealed so as to exclude micro-organisms.

Labelling. The designation sterile Bacitracin indicates that the substance complies with the additional requirements for sterile Bacitracin and may be used for parenteral administration or for other sterile applications.

Additional information. Bacitracin is hygroscopic. Its solutions deteriorate rapidly at room temperature. Even in the absence of light, it is gradually degraded on exposure to a humid atmosphere, the decomposition being faster at higher temperatures.

Requirements

Definition. Bacitracin is a polypeptide produced by the growth of an organism of the licheniformis group of Bacillus subtilis. The main components are Bacitracin A, B₁, and B₂.

Bacitracin contains not less than 55 International Units per mg, calculated with reference to the dried substance.

Identity test

Carry out the test as described under 1.14.1 Thin-layer chromatography, using silica gel R1 as the coating substance and a mixture of 60 volumes of 1-butanol R, 10 volumes of water, 6 volumes of pyridine R, 15 volumes of glacial acetic acid R, and 5 volumes of ethanol (~750 g/l) TS as the mobile phase. Apply separately to the plate 1 µl of each of 2 solutions in disodium edetate (10 g/l) TS containing (A) 6.0 mg of the test substance per mL and (B) 6.3 mg of bacitracin zinc RS per mL. A third spot (C) is made by applying 1 µl of each of solutions A and B at the same point of application, allowing to dry between the two loadings. After removing the plate from the chromatographic chamber, allow it to dry in air, spray it with triketohydrindene/pyridine/butanol TS, and heat it at 110 °C for 10 minutes. Allow to cool, and examine the chromatogram in daylight. The spots obtained with solution A correspond in position, appearance, and intensity with that obtained with solution B. A single spot is obtained with solution C.

Sulfated ash. Not more than 20 mg/g.

Loss on drying. Dry at 60 °C under reduced pressure (not exceeding 0.6 kPa or about 5 mm of mercury) for 3 hours; it loses not more than 50 mg/g.

pH value. Shake 1.0 g with 10 mL of carbon-dioxide-free water R; the pH is between 5.5 and 7.5.

Bacitracin F and related substances. Prepare a solution containing 30 mg in 100 mL of sulfuric acid (0.05 mol/l) VS. The ratio of the absorbance at 290 nm to that at 252 nm is not greater than 0.15.

Assay. Dissolve 0.05 g, accurately weighed, in 5 mL of water and add 0.5 mL of hydrochloric acid (~70 g/l) TS and sufficient water to produce 100 mL. Allow to stand at room temperature for 30 minutes and carry out the assay as described under 3.1 Microbiological assay of antibiotics, using Micrococcus luteus (NCTC 7743 or ATCC 10240) as the test organism, culture medium Cm1 with a final pH of either 7.0-7.1 or 6.5-6.6, sterile phosphate buffer TS of pH either 7.0 or 6.0, an appropriate concentration of bacitracin (usually 1-4 IU per mL), and an incubation temperature of either 35-39 °C or 32-35 °C. The precision of the assay is such that the fiducial limits of error of the estimated potency (P = 0.95) are not less than 95% and not more than 105% of the estimated potency. The upper fiducial limit of error of the estimated potency (P = 0.95) is not less than 55 IU per mg, calculated with reference to the dried substance.

Additional Requirements for Bacitracin for sterile use

Storage. Sterile Bacitracin should be kept in a hermetically closed container, protected from light, and stored at a temperature not exceeding 15 °C.

Bacterial endotoxins. Carry out the test as described under 3.4 Test for bacterial endotoxins; contains not more than 0.01 IU of endotoxin RS per mg of bacitracin.

Sterility. Complies with 3.2 Test for sterility.