Cetrimide (Cetrimidum)

Chemical name. Trimethyltetradecylammonium bromide mixture with dodecyltrimethylammonium bromide and hexadecyltrimethylammonium bromide; cetrimide; CAS Reg. No. 8044-71-1.

Description. A white or almost white, voluminous, free-flowing powder; odour, slight, characteristic.

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

Category. Antimicrobial preservative.

Storage. Cetrimide should be stored in a well-closed container.

Requirements

Definition. Cetrimide is a mixture consisting mainly of tetradecyltrimethylammonium bromide together with smaller amounts of dodecyltrimethylammonium bromide and hexadecyltrimethylammonium bromide.

Cetrimide contains not less than **96.0%** and not more than the equivalent of **101.0%** of alkyltrimethylammonium bromides, calculated as $C_{17}H_{38}BrN$ (relative molecular mass = 336.4) and with reference to the dried substance.

Identity tests

A. Dissolve 5 mg in 5 mL of phosphate buffer, pH 8.0, TS. Dip a strip of methyl green/iodomercurate paper R into the solution. Similarly prepare a blank solution without the Cetrimide being examined. After 5 minutes withdraw the strip of paper from the tube; the solution to be tested shows a darker greenish blue colour than the blank solution.

B. Dissolve 0.2 g in 10 mL of carbon-dioxide-free water R and shake; a voluminous froth is produced. (Keep the mixture for test C.)

C. The solution prepared above yields reaction A described under 2.1 General identification tests as characteristic of bromides.

Amines and amine salts. Dissolve 5 g in 30 mL of a mixture of 1 volume of hydrochloric acid (1 mol/l) VS and 99 volumes of methanol R and add 100 mL of 2-propanol R. Slowly pass a stream of nitrogen R through the solution. Gradually add 15 mL of tetrabutylammonium hydroxide (0.1 mol/l) VS and titrate potentiometrically, recording a titration curve; the volume of titrant added between the two points of inflexion is not larger than 2.0 mL.

Sulfated ash. Not more than 5.0 mg/g.

Loss on drying. Dry at 105 °C for 2 hours; it loses not more than 20 mg/g.

Acidity or alkalinity. Dissolve 1 g in 50 mL of carbon-dioxide-free water R and add 0.1 mL of bromocresol purple/ethanol TS; not more than 0.1 mL of hydrochloric acid (0.1 mol/l) VS or 0.1 mL of sodium hydroxide (0.1 mol/l) VS is required to obtain the midpoint of the indicator (grey).

Assay. Dissolve about 2 g, accurately weighed, in 100 mL of water. Transfer 25 mL to a separating funnel, add 25 mL of chloroform R, 10 mL of sodium hydroxide (0.1 mol/l) VS, and 10 mL of a freshly prepared solution containing 5 g of potassium iodide R in 100 mL of water. Shake well, allow to separate, and discard the chloroform layer. Shake the aqueous layer with three quantities, each of 10 mL, of chloroform R, and discard the chloroform layers. Add 40 mL of hydrochloric acid (~420 g/l) TS, allow to cool, and titrate with potassium iodate (0.05 mol/l) VS until the deep brown colour is almost discharged. Add 2 mL of chloroform R and continue the titration, shaking vigorously, until the colour of the chloroform layer no longer changes. Repeat the procedure with a mixture of 10 mL of the above freshly prepared solution of potassium iodide, 20 mL of water, and 40 mL of hydrochloric acid (~420 g/l) TS and make any necessary corrections.

Each mL of potassium iodate (0.05 mol/l) VS is equivalent to 33.64 mg of $C_{17}H_{38}BrN$.