

Sodium Polystyrene Sulphonate

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Please send any comments you may have on this draft document to lab.ipc@gov.in, with a copy to Dr. Gaurav Pratap Singh (email: gpsingh.ipc@gov.in) before the last date for comments.

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Sodium Polystyrene Sulphonate

C₈H₈O₃S

Mol. Wt. 184.2

Sodium Polystyrene Sulphonate is a cation-exchange resin prepared in the sodium form. Each g of sodium polystyrene sulphonate exchanges not less than 110 mg and not more than 135 mg of potassium, calculated on the anhydrous basis.

Category. Pharmaceutical aid; Treatment of hyperkalemia.

Description. A golden brown, fine powder.

Tests

Limit of ammonium salts. Disperse 1 g of the substance under examination in 5 ml of 1 M sodium hydroxide in a 50 ml beaker. Cover the beaker with a watch glass containing a moistened strip of red litmus paper on the underside and allow to stand for 15 minutes, the litmus paper shows no blue color.

Sodium content. Not less than 9.4 per cent and not more than 11.5 per cent, calculated on the anhydrous basis.

Solution A. A 2.0 per cent w/v solution of low-sodium, low potassium non-ionic surfactant (Such as Activator 90) in water.

Reference solution. Dissolve a quantity of sodium chloride in water to obtain a solution containing 5.0 mg of sodium per ml.

Reference solution graph. Into four 1000 ml flasks, pipet, respectively 0, 1, 2, and 3 ml of reference solution. To each flask, add 0.1 ml of nitric acid, 0.1 ml of sulphuric acid, and 10 ml of solution A, dilute with water to volume, and mix. Adjust the scale of a suitable flame spectrophotometer to a reading of 100 at a wavelength of 588 nm with the solution containing 15 mg of sodium per litre. Determine the instrument readings on the other three solutions, and plot the observed readings, on ruled coordinate paper, as the ordinate, and the concentration of sodium, in mg per liter, as the abscissa. The line intersects the ordinate at, or below, a scale reading of 25 ("blank reading").

Procedure. Ash the equivalent of 1 g of substance under examination, with a slight excess of sulphuric acid. Add 1 ml of nitric acid and a few ml of water to the residue. Warm to dissolve, and transfer with water to a 1000 ml volumetric flask, dilute with water to volume, and mix. Pipet 10.0 ml of the solution into a 100-ml volumetric flask, add 1 ml of solution A, dilute with water to volume, and mix. Determine the instrument reading concomitantly with the readings obtained for plotting the reference solution, and determine the sodium concentration, in mg per litre, by interpolation from the reference solution graph. Calculate the percentage of sodium, using following expression:

$$A/W$$

Where, A is the weight, in mg, of sodium found per litre and W is the weight, in g, of sodium polystyrene sulphonate taken.

Water (2.3.43). Not more than 10 per cent.

Potassium exchange capacity

Solution A. A 2.0 per cent w/v solution of low-sodium, low potassium non-ionic surfactant (such as Activator 90) in water.

Reference solution (a). Dissolve a quantity of potassium chloride in water to obtain a solution containing 5.0 mg of potassium per ml.

Reference solution (b). Dissolve a quantity of sodium chloride in water to obtain a solution containing 4.0 mg of sodium per ml.

Reference solution graph. Identify five 1000 ml volumetric flasks by the numbers 1, 2, 3, 4, and 5. In that order pipet into the flasks 4, 3, 2, 1, and 0 ml, respectively, of reference solution (b), and in the same order 0, 1, 2, 3, and 4 ml, respectively, of reference solution (a). To each flask add 10 ml of solution A, dilute with water to volume, and mix. Adjust the scale of a suitable flame spectrophotometer to 100 with solution from flask 5 at 766 nm. Determine the instrument readings with solutions from flasks 4, 3, 2, and 1. On ruled coordinate paper, plot the observed instrument readings as the ordinate, and the concentrations, in mg per liter, of potassium as the abscissa.

Procedure. Pipette 100 ml of reference solution (a) into a glass-stoppered flask containing about 1.6 g of sodium polystyrene sulphonate, accurately weighed, shake by mechanical means for 15 minutes, filter, and discard the first 20 ml of the filtrate. Pipet 5 ml of the filtrate into a 1000 ml volumetric flask, add 10 ml of solution A, dilute with water to volume, and mix. Observe the flame spectrophotometer readings of the exchanged solution concomitantly with those obtained for plotting the reference solution graph, and determine the potassium concentration, in mg per liter, by interpolation from the reference solution graph. Calculate the quantity, in mg per g, of potassium adsorbed on the resin using following expression:

$$(X - 20Y)/W$$

Where, X is the weight, in mg, of potassium in 100 ml of reference solution (a) before exchange; Y is the weight, in mg, of potassium per liter as interpolated from the reference solution graph; and W is the weight, in g, of sodium polystyrene

sulphonate taken, expressed on the anhydrous basis.

Storage. Preserve in well-closed containers.

Solubility.

Sodium polystyrene sulphonate. Practically insoluble in *water*, in *ethanol (95 per cent)*.

DRAFT FOR COMMENTS