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Croscarmellose Sodium

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DEFINITION

Croscarmellose Sodium is the sodium salt of a cross-linked, partly *O*-(carboxymethylated) cellulose.

IDENTIFICATION

Add the following:

▲ • **A. [SPECTROSCOPIC IDENTIFICATION TESTS \(197\)](#), [Infrared Spectroscopy](#):** 197A or 197K. [NOTE—Depending on the degree of substitution, the intensity of the absorption band at about 1750 cm⁻¹ may vary.]▲ (NF 1-May-2022)

Change to read:

• ▲ **B.**▲ (NF 1-May-2022)

Analysis: Mix 1 g with 100 mL of [methylene blue](#) solution (1 in 250,000), stir the mixture, and allow it to settle.

Acceptance criteria: The Croscarmellose Sodium absorbs the methylene blue and settles as a blue, fibrous mass.

Delete the following:

▲ • **B.** Mix 1 g with 50 mL of water. Transfer 1 mL of the mixture to a small test tube, and add 1 mL of water and 5 drops of [1-naphthol TS](#). Incline the test tube, and carefully add 2 mL of [sulfuric acid](#) down the side so that it forms a lower layer: a reddish-violet color develops at the interface.▲ (NF 1-May-2022)

Change to read:

• ▲ **C. [IDENTIFICATION TESTS—GENERAL \(191\)](#), [Chemical Identification Tests, Sodium](#)**

Sample: Dissolve a portion of the residue from the *Residue on Ignition* test in 2 mL of water.

Analysis: Add 2 mL of 15% [potassium carbonate](#), and heat to boiling. No precipitate is formed. Add 4 mL of [potassium pyroantimonate TS](#), and heat to boiling. Allow to cool in ice water and, if necessary, rub the inside of the test tube with a glass rod.

Acceptance criteria: A dense precipitate is formed.▲ (NF 1-May-2022)

IMPURITIES

• **[RESIDUE ON IGNITION \(281\)](#):** 14.0%–28.0%, calculated on the dried basis. Use 1.0 g for the test, and use sufficient [sulfuric acid](#) to moisten the entire residue after the initial charring step, and additional [sulfuric acid](#) if an excessive amount of carbonaceous material remains after the initial complete volatilization of white fumes.

• **• [SODIUM CHLORIDE AND SODIUM GLYCOLATE](#)**

Sodium chloride

Sample: 5 g of Croscarmellose Sodium

Analysis: Transfer the *Sample* to a 250-mL beaker. Add 50 mL of water and 5 mL of [30% hydrogen peroxide](#), and heat on a steam bath for 20 min, stirring occasionally to ensure hydration. Cool, and add 100 mL of water and 10 mL of [nitric acid](#). Titrate with 0.05 N silver nitrate VS, determining the endpoint potentiometrically, using a silver-based indicator electrode and a double-junction reference electrode containing 10% potassium nitrate filling solution in the outer jacket and a standard filling solution in the inner jacket, and stirring constantly (see [Titrimetry \(541\)](#)).

Calculate the percentage of sodium chloride in the specimen taken:

$$\text{Result} = (F \times V \times N) / [(100 - b) \times W]$$

F = equivalence factor for sodium chloride, 584.4

V = volume of the silver nitrate (mL)

N = normality of the silver nitrate

b = percentage of loss on drying, determined separately

W = weight of the specimen (g)

Sodium glycolate

Standard stock solution: Transfer 100 mg of [glycolic acid](#), previously dried in a desiccator at room temperature overnight, to a 100-mL volumetric flask. Dissolve in and dilute with water to volume, and mix. [NOTE—Use this solution within 30 days.]

Standard solution A: Transfer 1.0 mL of the *Standard stock solution* to a 100-mL volumetric flask. Add water to make 5 mL, then add 5 mL of [glacial acetic acid](#). Dilute with [acetone](#) to volume, and mix.

Standard solution B: Transfer 2.0 mL of the *Standard stock solution* to a 100-mL volumetric flask. Add water to make 5 mL, then add 5 mL of [glacial acetic acid](#). Dilute with [acetone](#) to volume, and mix.

Standard solution C: Transfer 3.0 mL of the *Standard stock solution* to a 100-mL volumetric flask. Add water to make 5 mL, then add 5 mL of [glacial acetic acid](#). Dilute with [acetone](#) to volume, and mix.

Standard solution D: Transfer 4.0 mL of the *Standard stock solution* to a 100-mL volumetric flask. Add water to make 5 mL, then add 5 mL of [glacial acetic acid](#). Dilute with [acetone](#) to volume, and mix.

Sample solution: Transfer 500 mg of croscarmellose sodium to a 100-mL beaker. Moisten thoroughly with 5 mL of [glacial acetic acid](#), followed by 5 mL of water, and stir with a glass rod to ensure proper hydration (usually about 15 min). Slowly add 50 mL of [acetone](#) while stirring, then add 1 g of [sodium chloride](#), and stir for several min to ensure complete precipitation of the carboxymethylcellulose. Filter through a soft, open-textured paper, previously wetted with a small amount of acetone, and collect the filtrate in a 100-mL volumetric flask. Use an additional 30 mL of acetone to facilitate the transfer of the solids and to wash the filter cake, then dilute with [acetone](#) to volume, and mix.

Analysis

Samples: *Standard solution A, Standard solution B, Standard solution C, Standard solution D, and Sample solution*

Transfer 2.0 mL of the *Sample solution* and 2.0 mL of each *Standard solution* to separate 25-mL volumetric flasks, and prepare a blank flask containing 2.0 mL of a solution containing 5% each of [glacial acetic acid](#) and water in [acetone](#). Place the uncovered flasks in a boiling water bath for 20 min to remove the acetone. Remove from the bath, and cool. Add to each flask 5.0 mL of [2,7-dihydroxynaphthalene TS](#), mix, add an additional 15 mL, and again mix. Cover the mouth of each flask with a small piece of aluminum foil. Place the flasks upright in a boiling water bath for 20 min, then remove from the bath, cool, dilute with sulfuric acid to volume, and mix.

Determine the absorbance of each solution at 540 nm, with a suitable spectrophotometer, against the blank, and prepare a standard curve using the absorbances obtained from each *Standard solution*.

Calculate the percentage of sodium glycolate in the specimen taken:

$$\text{Result} = (F \times W_1) / [(100 - b) \times W_2]$$

F = factor converting glycolic acid to sodium glycolate, 12.9

W_1 = weight of glycolic acid in the specimen, determined from the standard curve and the absorbance of the *Sample solution* (mg)

b = percentage of loss on drying, determined separately

W_2 = weight of the specimen taken (g)

Acceptance criteria: The sum of the percentages of sodium chloride and sodium glycolate is NMT 0.5%.

SPECIFIC TESTS

• CONTENT OF WATER-SOLUBLE MATERIAL

Analysis: Disperse 10 g in 800 mL of water, and stir for 1 min every 10 min during the first 30 min. Allow to stand for an additional hour, or centrifuge, if necessary. Decant 200 mL of the aqueous slurry onto a rapid-filtering filter paper in a vacuum filtration funnel, apply vacuum, and collect about 150 mL of the filtrate. Pour the filtrate into a tared 250-mL beaker, weigh, and calculate the weight, in g, of the filtrate, W_3 , by difference. Concentrate on a hot plate to a small volume, but not to dryness; dry at 105° for 4 h; and again weigh. Calculate, in grams, the weight of the residue by difference, W_1 .

Calculate the percentage of water-soluble material in the specimen, on the dried basis, taken:

$$\text{Result} = [100 \times W_1 \times (800 + W_2)] / \{W_2 \times W_3 \times [1 - (0.01 \times b)]\}$$

