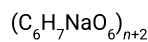
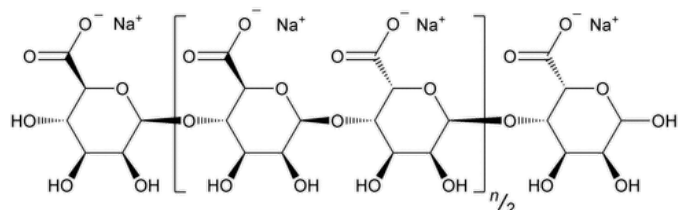


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Sodium Alginate



Alginic acid, sodium salt;

Sodium alginate

CAS RN[®]: 9005-38-3.

DEFINITION

Sodium Alginate is the purified carbohydrate product extracted from brown seaweeds by the use of dilute alkali. It consists chiefly of the sodium salt of Alginic Acid, a linear, unbranched, amorphous copolymer of β -D-mannuronic acid (M) and α -L-guluronic acid (G) linked to each other by 1 $\rightarrow$ 4 glycosidic bonds. The M and G units in the alginates may be randomly or non-randomly arrayed as heterogeneous or homogeneous sequences. It contains NLT 90.8% and NMT 106.0% of sodium alginate, calculated on the dried basis. The typical average molecular weight for Sodium Alginate is in the range of 10,000–600,000 g/mol.

IDENTIFICATION

• **A.** [SPECTROSCOPIC IDENTIFICATION TESTS \(197\)](#), [Infrared Spectroscopy](#): 197K or 197A

• **B.**

Sample solution 1: A solution (1 in 100)

Analysis 1: To 5 mL of *Sample solution 1* add 1 mL of [calcium chloride TS](#).

Acceptance criteria 1: A voluminous, gelatinous precipitate is formed immediately.

Sample solution 2: A solution (1 in 100)

Analysis 2: To 10 mL of *Sample solution 2* add 1 mL of 4 N sulfuric acid.

Acceptance criteria 2: A heavy, gelatinous precipitate is formed.

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

Sample solution: Ignite 0.2 g of Sodium Alginate at 700° for 2 h, and dissolve the residue in 2 mL of water.

15% Potassium carbonate solution: Dissolve 7.5 g of [potassium carbonate](#) in 50 mL of water and mix well.

Analysis 1: Transfer 2 mL of the *Sample solution* to a test tube, add 2 mL of 15% *Potassium carbonate solution*, and heat to boiling.

Acceptance criteria 1: No precipitate is formed.

Analysis 2: To the test tube from *Analysis 1* add 4 mL of [potassium pyroantimonate TS](#), heat to boiling, cool in ice water, and rub the inside of the test tube with a glass rod.

Acceptance criteria 2: A dense precipitate is formed.

ASSAY

Change to read:

• **PROCEDURE**

Transfer 200 mL of [0.5 N hydrochloric acid VS](#) to a 400-mL beaker. Place it on a magnetic stirrer and stir. Weigh about 1.0 g of Sodium Alginate. Add the sample to acid with stirring. Stir for 30 min and leave the solution for another 30 min. Filter through a suitable glass crucible. Wash the filter with [water](#) until the pH of the filtrate water is neutral. Transfer the contents of the filter crucible to a beaker. Flush the

filter crucible with water. Place the beaker on a stirrer and start stirring. Add a few drops of [phenolphthalein indicator](#) solution and titrate with [0.5 N sodium hydroxide](#) until it is a stable pink color. Note the amount of [sodium hydroxide](#) consumed in milliliters (V_2).

Analysis: Each milliliter of [0.5 N sodium hydroxide](#) consumed is equivalent to 55.50 mg of Sodium Alginate (equivalent weight 222.00g/mol). Calculate the percentage of sodium alginate in the portion of Sodium Alginate taken:

$$\text{Result} = (V_2 \times N \times W_E \times 10) / (W \times D) \quad (\text{ERR 1-Sep-2023})$$

V_2 = volume of sodium hydroxide consumed (mL)

N = normality of sodium hydroxide solution

W_E = equivalent weight of Sodium Alginate, 222.0 g/mol

W = sample weight (g)

D = percent dry matter value for the sample

Acceptance criteria: 90.8%–106.0% on the dried basis

IMPURITIES

• LIMIT OF LEAD AND ARSENIC

[NOTE—When [water](#) is specified as the diluent, use deionized ultra-filtered [water](#). Use of glass volumetric flasks is discouraged.]

Diluent: Weigh around 3.5 g of sodium nitrate in a 1000-mL volumetric flask. Add 500 mL of [water](#) to dissolve. Add 170 mL of nitric acid, ultratrace, and mix. Cool to room temperature and dilute with [water](#) to volume.

Standard stock solution: Into a 10-mL volumetric flask, transfer 100 μL of a standard solution containing 1000 mg/L of arsenic¹ and 500 μL of a standard solution containing 1000 mg/L of lead.² Add 1–2 drops of nitric acid, ultratrace. Dilute with water to volume.

Internal standard solution: Transfer 1.0 mL of a standard solution containing 10,000 mg/L of yttrium³ to a 100-mL volumetric flask. Add 1–2 drops of nitric acid, ultratrace, and dilute with [water](#) to volume. [NOTE—The concentration of the *Internal standard solution* can be adjusted if a high number of signal counts from the *Internal standard solution* causes an artifact.]

Calibration standard solution A: Into a separate 100-mL volumetric flask, prepare a solution containing 0.01 $\mu\text{g/mL}$ of arsenic and 0.05 $\mu\text{g/mL}$ of lead from the *Standard stock solution*. To each flask, add 100 μL of the *Internal standard solution* and 20 μL of a standard solution containing 1000 mg/L of gold.⁴ Dilute with *Diluent* to volume.

Calibration standard solution B: Into a separate 100-mL volumetric flask, prepare a solution containing 0.02 $\mu\text{g/mL}$ of arsenic and 0.1 $\mu\text{g/mL}$ of lead from the *Standard stock solution*. To each flask, add 100 μL of the *Internal standard solution* and 20 μL of a standard solution containing 1000 mg/L of gold. Dilute with *Diluent* to volume.

Calibration standard solution C: Into a separate 100-mL volumetric flask, prepare a solution containing 0.04 $\mu\text{g/mL}$ of arsenic and 0.2 $\mu\text{g/mL}$ of lead from the *Standard stock solution*. To each flask, add 100 μL of the *Internal standard solution* and 20 μL of a standard solution containing 1000 mg/L of gold. Dilute with *Diluent* to volume.

Blank solution: In a 100-mL volumetric flask, add 100 μL of the *Internal standard solution*. Add 20 μL of a standard solution containing 1000 mg/L of gold to the same flask. Dilute with *Diluent* to volume, and mix well.

Sample solution: Weigh about 0.50 g of Sodium Alginate in a Teflon pressure vessel. Add 10 mL of nitric acid, ultratrace. Add 10 μL of a standard solution containing 1000 mg/L of gold. Screw the cap of the pressure vessel and commence digestion in a microwave digester per the program given in [Table 1](#).

Table 1

Sequence	Temperature (°)	Power (W)	Time (min)
Ramp to	80	400	5
Hold at	80	400	5
Ramp to	150	800	10
Hold at	150	800	10
Ramp to	170	800	10