

SODIUM ALGINATE

Prepared at the 49th JECFA (1997) , published in FNP 52 Add 5 (1997) superseding specifications prepared at the 44th JECFA (1995), published in FNP 52 Add 3 (1995). An ADI 'not specified' was established at the 39th JECFA (1992)

SYNONYMS

INS No. 401

DEFINITION

Sodium salt of alginic acid

C.A.S. number

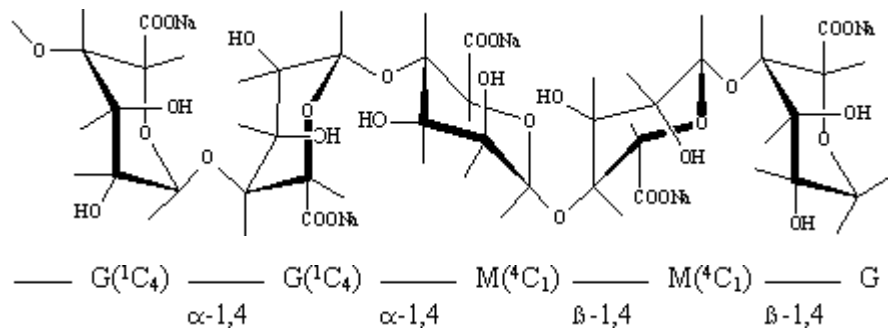
9005-38-3

Chemical formula

$(C_6H_7NaO_6)_n$

Structural formula

Structural formula from Phillips, Wedlock and Williams: Gums and Stabilizers for the Food Industry 5 (1990) by permission of Oxford University Press.



The number and sequence of the Mannuronate and Glucuronate residues shown above vary in the naturally occurring alginate. The water molecules associated with the alginate molecule are not shown in the above structural formula.

Formula weight

Structural unit : 198.11 (theoretical), 222 (actual average)
Macromolecule : 10,000 - 600,000 (typical average)

Assay

Yields, on the dried basis, not less than 18.0% and not more than 21.0% of carbon dioxide (CO₂), equivalent to not less than 90.8% and not more than 106.0% of sodium alginate (C₆H₇NaO₆)_n.

DESCRIPTION

White to yellowish brown filamentous, grainy, granular or powdered forms

FUNCTIONAL USES

Stabilizer, thickener, gelling agent, emulsifier

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4)

Dissolves slowly in water, forming a viscous solution; insoluble in ethanol and ether

Precipitate formation with calcium chloride To a 0.5% solution of the sample in sodium hydroxide TS add one-fifth of its volume of a 2.5% solution of calcium chloride. A voluminous, gelatinous precipitate is formed. This test distinguishes sodium alginate from gum arabic, sodium carboxymethyl cellulose, carrageenan, gelatin, gum ghatti, karaya gum, carob bean gum, methyl cellulose and tragacanth gum.

Precipitate formation with ammonium sulphate To a 0.5% solution of the sample in sodium hydroxide TS add one-half of its volume of a saturated solution of ammonium sulfate. No precipitate is formed. This test distinguishes sodium alginate from agar, sodium carboxymethyl cellulose, carrageenan, de-esterified pectin, gelatin, carob bean gum, methyl cellulose and starch.

Test for alginate (Vol. 4) Passes test

Test for sodium (Vol. 4) Passes test

PURITY

Loss on drying (Vol. 4) Not more than 15% (105°, 4 h)

Water-insoluble matter Not more than 2% on the dried basis
See description under TESTS

Arsenic (Vol. 4) Not more than 3 mg/kg (Method II)

Lead (Vol. 4) Not more than 5 mg/kg
Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, "Instrumental Methods."

Microbiological criteria (Vol. 4) Total plate count: Not more than 5,000 colonies per gram.
Initially prepare a 10^{-1} dilution by adding a 50 g sample to 450 ml of Butterfield's phosphate buffered dilution water and homogenizing in a high speed blender.
Yeasts and moulds: Not more than 500 colonies per gram
Coliforms: Negative by test
Salmonella: Negative by test

TESTS

PURITY TESTS

Water-insoluble matter Disperse 2 g of the sample, weighed to the nearest 0.1 mg, in 800 ml of water in a 2,000-ml flask. Neutralize to pH 7 with sodium hydroxide TS and then add 3 ml in excess. Add 40 ml of hydrogen peroxide solution containing 30% by weight H_2O_2 , cover the flask and boil for 1 h with frequent stirring. Filter while hot through a tared Gooch crucible provided with a glass fibre filter (2.4 cm, No 934 AH, Reeve Angel & Co, Clifton, N.Y., USA, or equivalent). If slow filtration is caused by high viscosity of the sample solution, boil until the viscosity is reduced enough to permit filtration. Wash the crucible thoroughly with hot water, dry the crucible and its contents at 105° for 1 h, cool and weigh. Calculate as percentage of the

dry weight.

**METHOD OF
ASSAY**

Proceed as directed under *Carbon Dioxide Determination by Decarboxylation* (see Volume 4). Each ml of 0.25 N sodium hydroxide consumed is equivalent to 5.5 mg of carbon dioxide (CO₂) or 27.75 mg of sodium alginate (equivalent weight 222).