POTASSIUM 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. 402

DEFINITION Potassium salt of alginic acid

C.A.S. number 9005-36-1

Chemical formula $(C_6 H_7 KO_6)_n$

Structural formula Structural formula from Phillips, Wedlock, 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 associated water molecules are not shown.

Formula weight Structural unit: 214.22 (theoretical), 238 (actual average)

Macromolecule: 10,000 - 600,000 (typical average)

Assay Yields, on the dried basis, not less than 16.5% and not more than 19.5% of

carbon dioxide (CO₂), equivalent to not less than 89.2% and not more than

105.5% of potassium alginate (C₆H₇KO₆)_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 To a 0.5% solution of the sample in sodium hydroxide TS add one-fifth of its

calcium chloride

volume of a 2.5% solution of calcium chloride. A voluminous, gelatinous precipitate is formed. This test distinguishes potassium alginate from gum arabic, sodium carboxymethyl cellulose, carrageenan, gelatin, gum ghatti. karaya gum, carob bean gum, methyl cellulose and tragacanth gum.

ammonium sulfate

Precipitate formation with 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 potassium 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

Potassium (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

IDENTIFICATION 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 H₂O₂, 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., or equivalent filter). 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*. Each ml of 0.25 N sodium hydroxide consumed is equivalent to 5.5 mg of carbon dioxide (CO₂) or 29.75 mg of potassium alginate (equivalent weight 238).