GUAR GUM (CLARIFIED)

(TENTATIVE)

New tentative specifications prepared at the 67th JECFA (2006) and published in FAO JECFA Monographs 3 (2006). An ADI "not specified" established was established at the 19th JECFA (1975) for guar gum.

Information required on synonyms, gum content, description, functional uses, solubility in water, loss on drying, total ash, acid-insoluble matter, protein, and a test method to determine ethanol and isopropanol using capillary gas chromatography.

Note: The tentative specifications will be withdrawn unless the required information is received before the end of 2007.

SYNONYMS INS No. 412

DEFINITION Primarily the ground endosperm of the seeds from *Cyamopsis tetragonolobus* (L.) Taub. (Fam. *Leguminosae*) mainly consisting of high molecular weight (50,000-8,000,000) polysaccharides composed of galactomannans; mannose:galactose ratio is about 2:1. The seeds are dehusked, milled and screened to obtain the ground endosperm (native guar gum). The gum is clarified by dissolution in water, precipitation and recovery with ethanol or isopropanol. Clarified guar gum does not contain cell wall materials.

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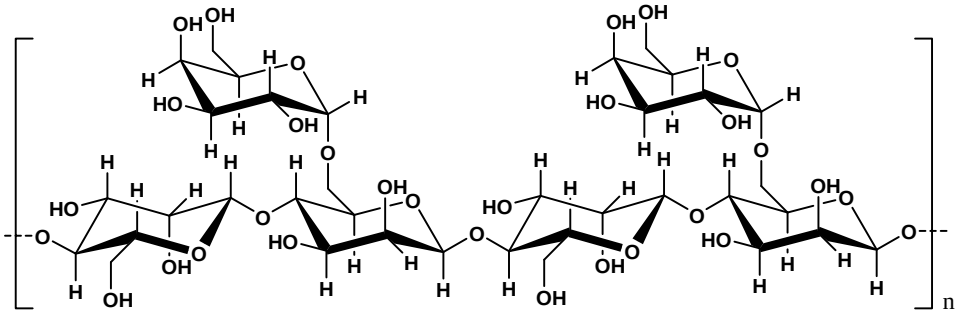
C.A.S. number 9000-30-0

Structural formula



DESCRIPTION White to yellowish-white, nearly odourless, free-flowing powder

FUNCTIONAL USES Thickener, stabilizer, emulsifier

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Insoluble in ethanol

Gel formation	Add small amounts of sodium borate TS to an aqueous solution of the sample; a gel is formed.
Viscosity	Transfer 2 g of the sample into a 400-ml beaker and moisten thoroughly with about 4 ml of isopropanol. Add 200 ml of water with vigorous stirring until the gum is completely and uniformly dispersed. An opalescent, viscous solution is formed. Transfer 100 ml of this solution into another 400-ml beaker, heat the mixture in a boiling water bath for about 10 min and cool to room temperature. There is no substantial increase in viscosity.
Gum constituents (Vol. 4)	Proceed as directed under Gum Constituents Identification using 100 mg of the sample instead of 200 mg and 1 - 10 µl of the hydrolysate instead of 1 - 5 µl. Use galactose and mannose as reference standards. These constituents should be present.

PURITY

Loss on drying (Vol. 4)	*Information required*
Borate	Dissolve 1 g of the sample in 100 ml of water. The solution should remain fluid and not form a gel on standing. Mix 10 ml of dilute hydrochloric acid with the solution, and apply one drop of the resulting mixture to turmeric paper. No brownish red colour is formed, which upon drying becomes intensified and changes to greenish black when moistened with ammonia TS.
Total ash (Vol. 4)	*Information required*
Acid-insoluble matter (Vol. 4)	*Information required*
Protein (Vol. 4)	*Information required*
Ethanol and isopropanol	Not more than 1%, singly or in combination See description under TESTS
Lead (Vol. 4)	Not more than 2 mg/kg Determine using an AAS/ICP-AES technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the methods described in Volume 4.
Microbiological criteria	Total plate count (Vol. 4): Not more than 5,000 CFU/g *E. coli:* Negative in 1g See description under TESTS *Salmonella* (Vol. 4): Negative in 25g Yeasts and moulds (Vol. 4): Not more than 500 CFU/g

TESTS

PURITY TESTS

Ethanol and isopropanol

Information required on a method using capillary gas chromatography to replace the method below.

Principle
The alcohols are converted to the corresponding nitrite esters and determined by *headspace gas chromatography.*

Sample preparation
Dissolve 100 mg of sample in 10 ml of water.

Internal standard solution
Prepare an aqueous solution containing 50 mg/l of n-propanol.

Standard alcohol solution
Prepare an aqueous solution containing 50 mg/l each of ethanol and isopropanol.

Procedure
Weigh 200 mg of urea into a 25-ml "dark vial" (Reacti-flasks, Pierce, Rockford, IL, USA, or equivalent). Purge with nitrogen for 5 min and then add 1 ml of saturated oxalic acid solution, close with a rubber stopper and swirl. Add 1 ml of sample solution, 1 ml of internal standard solution, and simultaneously start a stop watch (T=0). Swirl the vial and recap with an open screw cap fitted with a silicone rubber septum. Swirl until T=30 sec. At T=45 sec inject through the septum 0.5 ml of an aqueous solution of sodium nitrite (250 g/l). Swirl until T=70 sec and at T=150 sec withdraw through the septum 1 ml of the headspace using a pressure lock syringe (Precision Sampling Corp., Baton Rouge, Louisiana, USA, or equivalent.

Gas chromatography
Insert syringe needle in the injection port; precompress the sample, then open the syringe and inject the sample.
Use the following conditions:
- Column: glass (4mm i.d., 90 cm)
- Packing: first 15 cm packed with chrompack (or equivalent) and the remainder with Porapak R 120-150 mesh (or equivalent)
- Carrier gas: nitrogen (flow rate: 80 ml/min)
- Detector: flame ionization
- Temperatures: injection port: 250º; column: 150º isothermal

Calculation
Quantify the ethanol and isopropanol present in the sample by comparing the peak areas with the corresponding peaks obtained by chromatographing the headspace produced by substituting in the procedure 1 ml of Standard alcohol solution for 1 ml of sample solution.

Microbiological criteria

E. coli determination

The use of mannan endo-1,4-betamannosidase (EC 3.2.1.78) to degrade the gum sample prior to analysis is essential in order to avoid gelling of the gum during its addition to the enrichment broth. Prepare a 1.0% mannosidase solution (1 g mannan endo-1,4-betamannosidase to 99 ml water) and sterilize by filtration through a 0.45 µm membrane. (The mannosidase solution may be stored at 2-5° for up to two weeks.) Into a sterile tube containing 9 ml of sterile lauryl sulfate tryptose (LST) broth, aseptically add 0.1 ml of the sterile 1% mannosidase solution. Add 1g gum sample to the tube and vortex vigorously to disperse the sample. Incubate the tube for 24-48 h at 35±1°. After 24 h, gently agitate the tube and examine for gas production, i.e., effervescence. Reincubate for an additional 24 hours if no gas evolution is observed. Examine a second time for gas. Perform the confirmation test for coliforms on the presumptive positive (gassing) result, according to the procedure in Volume 4.