

O63300 – O63330 Gum Arabic

Prepared at the 49th JECFA (1997)

superseding specifications prepared at the 44th JECFA (1995), published in FNP 52 Addendum 3 (1995)

SYNONYMS	Acacia gum, arabic gum; INS No. 414
DEFINITION	Gum Arabic is a dried exudate obtained from the stems and branches of <i>Acacia senegal</i> (L.) Willdenow or closely related species of Acacia (fam. Leguminosae). <i>A. seyal</i> is a closely related species. Gum arabic consists mainly of high-molecular weight polysaccharides and their calcium, magnesium, and potassium salts, which on hydrolysis yield arabinose, galactose, rhamnose, and glucuronic acid. Items of commerce may contain extraneous materials such as sand and pieces of bark which must be removed before use in food. Gum arabic from <i>A. seyal</i> is sometimes referred to as gum talha.
C.A.S. number	9000-01-5
DESCRIPTION	Gum Arabic from <i>A. senegal</i> is a pale white to orange-brown solid, which breaks with a glassy fracture. The best grades are in the form of whole, spheroidal tears of varying size with a matte surface texture. When ground, the pieces are paler and have a glassy appearance. Gum from other acacia species may not have the characteristic tear shape and are often darker in colour. Gum from <i>A. seyal</i> is more brittle than the hard tears of <i>A. senegal</i> . Gum arabic is also available commercially in the form of white to yellowish-white flakes, granules, powder, roller-dried, or spray-dried material.
FUNCTIONAL USES	Emulsifier, stabilizer, and thickener
CHARACTERISTICS	
IDENTIFICATION	
<i>Solubility</i>	One gram dissolves in 2 ml of water forming a solution which flows readily and is acid to litmus, insoluble in ethanol
Hydrolysis products	Passes test See description under TESTS
Optical rotation	Gum from <i>A. senegal</i> : water solutions are levorotatory Gum from <i>A. seyal</i> : water solutions are dextrorotatory See description under TESTS

PURITY		
<i>Loss on drying</i>	Not more than 15% (105°, 5h) for granular and not more than 10% (105°, 4h) for spray-dried material Unground samples should be powdered to pass through a No. 40 sieve and mixed well before weighing	
<i>Total ash</i>	Not more than 4%	
<i>Acid insoluble ash</i>	Not more than 0.5%	
<i>Acid insoluble matter</i>	Not more than 1%	
<i>Arsenic</i>	Not more than 3 mg/kg (Method II)	
<i>Lead</i>	Not more than 5 mg/kg Prepare a sample solution as directed for organic compounds in the Limit Test, using 5 □ g of lead ion (Pb) in the control	
<i>Starch or dextrin</i>	Passes test See description under TESTS	
<i>Tannin-bearing gums</i>	Passes test See description under TESTS	
<i>Microbiological criteria</i>	<i>Salmonella</i> Spp.	Negative per test
	<i>E. coli</i>	Negative in 1 g

TESTS	
IDENTIFICATION TESTS	
Hydrolysis products	<p>Identify arabinose, galactose, rhamnose and glucuronic acid as follows:</p> <p>Boil a mixture of 100 mg of the sample and 20 ml of 10% sulfuric acid for 3h. Allow to cool and add excess barium carbonate, mixing with a magnetic stirrer until the solution is of pH 7, and filter. Evaporate the filtrate in a rotary evaporator at 30-50° in vacuum until a crystalline or syrupy residue is obtained. Dissolve in 10 ml of 40% methanol. This is the hydrolysate.</p> <p>Place 1 to 10 spots of the hydrolysate on the starting line of two chromatoplates and spots containing 1 to 10 g of arabinose, galactose, rhamnose and glucuronic acid, expected to be present in the hydrolysate. Use two solvent systems one for each plate: A. a mixture of formic acid, methyl ethyl ketone, tertiary butanol and water (15:30:40:15 by volume) and B. a mixture of isopropanol, pyridine, acetic acid and water (40:40:5:20 by volume) to develop the plates. After development, spray with a solution of 1.23 g anisidine and 1.66 g phthalic acid in 100 ml ethanol and heat the plates at 100° for 10 min. A greenish yellow colour is produced with hexoses, a red colour with pentoses and a brown colour with uronic acids. Compare sample spots with those for the solutions of arabinose, galactose, rhamnose and glucuronic acid. Additional spots corresponding to mannose, xylose, and galacturonic acid should be absent.</p>
Optical rotation	Test a solution of 10 g of sample (dry basis) in 100 ml of water (if necessary, previously filtered through a No. 42 paper or 0.8 m millipore filter), using a 200-mm tube.
PURITY TESTS	
Starch or dextrin	Boil a 1 in 50 solution of the sample, cool and add a few drops of iodine TS. No bluish or reddish colour should be produced.
Tannin-bearing gums	To 10 ml of a 1 in 50 solution of the sample add about 0.1 ml of ferric chloride TS. No blackish colouration or blackish precipitate should be formed.