



## SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

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### PHARMACEUTICAL AIDS

#### ACACIA GUM

**Synonyms :** Acacia gum, Indian Gum and Gum Arabic.

**Biological Source :** Acacia is the dried gummy exudation obtained from the stems and branches of *Acacia senegal*.

**Family :** Leguminosae

**Geographical Source :** Anglo-Egyptian Sudan and the northern Sahara.

**Morphology :**

Colour	Tears are usually white, pale-yellow and sometimes creamish-brown to red in colour. The powder has off-white, pale-yellow or light-brown in appearance.
Odour	Odourless
Taste	Bland and mucilaginous
Shape and Size	Tears are mostly spheroidal or ovoid in shape and having a diameter of about 2.5–3.0 cm
Appearance	Tears are invariably opaque either due to the presence of cracks or fissures produced on the outer surface during the process or ripening. The fracture is usually very brittle in nature and the exposed surface appears to be glossy.



### **Chemical constituents :**

Acacia consists principally of arabin, which is a complex mixture of calcium, magnesium and potassium salts of arabic acid. Arabic acid is a branched polysaccharide that yields L-arabinose, D-galactose, D-glucuronic acid and L-rhamnose on hydrolysis.

### **Chemical Tests :**

1. **Lead acetate test:** An aqueous solution of acacia when treated with lead acetate solution yields a heavy white precipitate.
2. **Reducing sugars test:** Hydrolysis of an aqueous solution of acacia with dilute HCl yields reducing sugars whose presence are ascertained by boiling with Fehling's solution to give a brick-red precipitate of cuprous oxide.
3. **Blue colouration due to enzyme:** When the aqueous solution of acacia is treated with benzidine in alcohol together with a few drops of hydrogen peroxide ( $H_2O_2$ ), it gives rise to a distinct blue colour due to the presence of oxidases enzyme.
4. **Borax test:** An aqueous solution of acacia affords a stiff translucent mass on treatment with borax.
5. **Specific test:** A 10% aqueous solution of acacia fails to produce any precipitate with dilute solution of lead acetate (a clear distinction from Agar and Tragacanth); it does not give any colour change with Iodine solution (a marked distinction from starch and dextrin); and it never produces a bluish-black colour with  $FeCl_3$  solution (an apparent distinction from tannins).

**Uses:**

- The mucilage of acacia is employed as a demulcent.
- It is used extensively as a vital pharmaceutical aid for emulsification and to serve as a thickening agent.
- It finds its enormous application as a binding agent for tablets, for example, cough lozenges.

**Allied Drugs :**

- *Talka gum*
- *Ghatti* or *Indian gum*
- West African Gum Combretum

**TRAGACANTH**

**Synonyms :** Goat's thorn, gum dragon, gum tragacanth, hog gum.

**Biological Source :** It is the air dried gummy exudates, flowing naturally or obtained by incision, from the stems and branches of *Astra-galus gummifer* Labill and certain other species of *Astragalus*.

**Family :** Leguminosae.

**Geographical Source :** Turkey, Syria, Iran, Iraq and U.S.S.R.

**Morphology :**

Colour	The flakes are white or pale yellowish-white
Odour	Odourless
Taste	Mucilaginous
Shape and Size	Tragacanth occurs in the form of ribbon or flakes. Flakes are approximately 25 x 12 x 2 mm in size
Appearance	The gum is horny, translucent with transverse and longitudinal ridges Fracture is short



### **Chemical Constituents :**

1)Tragacanth comprises two vital fractions:

- a) water soluble portion termed as '**tragacanthin**' and
- b) water insoluble portion known as '**bassorin**'.

2)Tragacanth gum is composed mainly of sugars and uronic acid units.

### **Chemical Tests :**

1. An aqueous solution of tragacanth on boiling with conc. HCl does not develop a red colour.
2. It does not produce red colour with ruthenium red solution.
3. When a solution of tragacanth is boiled with few drops of FeCl<sub>3</sub> [aqueous 10% (w/v)], it produces a deep-yellow precipitate.
4. It gives a heavy precipitate with lead acetate.
5. When tragacanth and precipitated copper oxide are made to dissolve in conc. NH<sub>4</sub>OH, it yields a meager precipitate.

**Uses :**

- It is used as a demulcent in cough and cold preparations and to manage diarrhoea.
- It is used as an emollient in cosmetics.
- Tragacanth is used as a thickening, suspending and as an emulsifying agent.

**Adulterant and Substitutes :**

- Hog tragacanth
- Karaya gum or sterculia gum or Indian tragacanth.

**SODIUM ALGINATE**

**Synonyms :** Algin, Alginic acid sodium salt, Sodium polymannuronate,

**Biological Source :**

Sodium alginate is the sodium salt of alginic acid. Alginic acid is a polyuronic acid composed of reduced mannuronic and glucuronic acids, which are obtained from the algal growth of the species *Macrocystis pyrifera*, *Laminaria hyperborea*, *Laminaria digitata*, *Ascophyllum nodosum*. It is a purified carbohydrate extracted from brown seaweed (algae) by treatment of dilute alkali.

**Family :** Phaeophyceae

**Geographical Source :**

Sea-weeds are found in Atlantic and Pacific oceans, particularly in coastal lines of Japan, United States, Canada, Australia and Scotland. In India, it is found near the coast of Saurashtra. The largest production of algin is in United States and U.K.

## Morphology :

Colour	White to buff coloured powder
Odour	Odourless
Taste	Tasteless
Appearance	It is available either as a coarse or fine powder. It is readily soluble in water forming viscous colloidal solution and insoluble in alcohol, ether, chloroform and strong acids. 1% solution of gum at 20°C may have a viscosity in the range of 20–400 centipoises.



## Identification Tests :

### *1) Precipitate formation with Calcium chloride*

To a 0.5% solution of the sample in sodium hydroxide, 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 and tragacanth gum.

## ***2) Precipitate formation with Ammonium sulphate***

To a 0.5% solution of the sample in sodium hydroxide, add one-half of its volume of a saturated solution of ammonium sulphate. No precipitate is formed. This test distinguishes sodium alginate from agar, sodium carboxymethyl cellulose, carrageenan, methyl cellulose and starch.

## ***3) Test for alginate***

Moisten 1–5 mg of the sample with water and add 1 ml of acid ferric sulphate. Within 5 min, a cherry-red colour develops that finally becomes deep purple.

1% solution in water forms heavy gelatinous precipitate with dilute sulphuric acid.

## **Chemical Constituents :**

Algin consists chiefly of the sodium salt of alginic acid, a linear polymer of L-guluronic acid and D-mannuronic acid.

## **Uses :**

- Sodium alginate are used in the preparation of paste, creams and for thickening and stabilizing emulsions.
- It is a good suspending and thickening agent, but a poor emulsifying agent.
- It is used as binding and disintegrating agent in tablets and lozenges.