

6.1.16. Guar Gum

Guar gum powder is obtained from the Guar seed undergoing multiple industrial processes. Guar gum attains uniformity and very high viscosity at low concentrations by getting rapidly hydrated in cold water. Being colloidal in nature, it provides excellent thickening to the solution.

Synonyms

Guar flour, decorpa, jaguar, jaguar gum, guaran, gum cyamopsis, and cyamopsis gum.

Source

Guar gum is the powder of the endosperm of the seeds of *Cyamopsis tetragonolobus* Linn.

Family

Leguminosae

Occurrence and Distribution

The plant from which guar gum is obtained is an annual shrub (figure 6.6) either growing wild or cultivated in dry climate. In India, it is cultivated in Maharashtra, Gujarat, Karnataka, and Rajasthan. The plant is also grown in Pakistan.

Organoleptic Evaluation

- 1) **Colour:** Colourless or pale yellowish-white.
- 2) **Odour:** Characteristic.

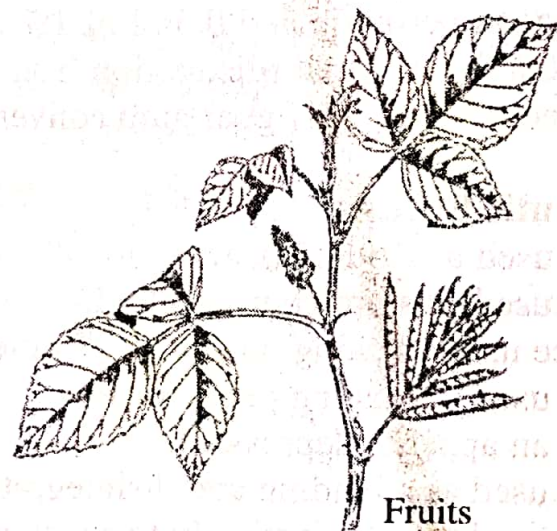
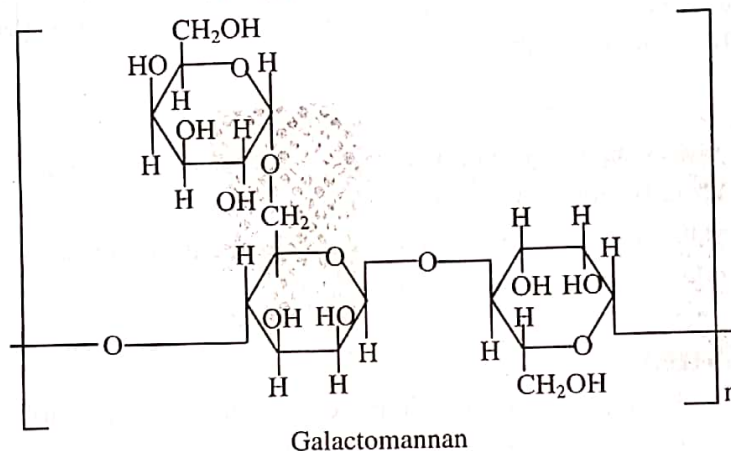


Figure 6.6: *Cyamopsis tetragonolobus*

- 3) **Taste:** Mucilaginous.
- 4) **Solubility:** Completely soluble in cold and hot water; insoluble in alcohol; practically insoluble in oils, greases, hydrocarbons, ketones and esters.
- 5) **Extra Features:** The solutions of guar gum in water are tasteless, odourless, non-toxic, neutral, heat stable, and possess 5-8 times thickening power than starch. In water, guar gum forms a thick colloidal solution and swells rapidly.

Chemical Constituents

Galactomannan (guaran) is the major constituent of guar gum. This substance hydrolyses to yield **galactose** and **mannose**. The water soluble content of guar gum is guaran which consists of linear chains of (1→4)-β-D mannopyranosyl units with α-D-galactopyranosyl units attached by (1→6) linkages. However, the ratio of D-galactose to D-mannose is 1:2. The gum also contains 5-7% of proteins.



Chemical Tests

- 1) On treating with a weak solution of iodine, guar gum fails to attain olive green colour.
- 2) On treatment of the gummy solution with ruthenium red solution, it fails to attain pink colour (distinction from agar).
- 3) Guar gum solution with 2% lead acetate solution forms a precipitate.
- 4) On dissolving 0.5gm guar gum in 20ml water by shaking, and adding 0.5ml hydrogen peroxide and 0.5ml of 1% solution of benzidine in alcohol, guar gum fails to attain blue colour (distinction from gum acacia).
- 5) Aqueous solution of guar gum converts to a gel on adding a small amount of borax.

Therapeutic Efficacy

- 1) It is used as a bulk laxative.
- 2) It is used as a protective colloid.
- 3) Since its thickening power is 5-8 times more than starch, it is used as a thickener.
- 4) It is used in treating peptic ulcer.
- 5) It is an appetite depressant.
- 6) It is used as a binding and disintegrating agent in tablet manufacturing.
- 7) It is used pharmaceutically to produce jelly.
- 8) It is used in suspensions, emulsions, lotions, creams, and toothpastes.

6.1.17. Gelatin

Gelatin is derived from collagen obtained from various animal body parts. It is commonly used as a gelling agent in food, pharmaceutical drugs, vitamin capsules, photography, and cosmetic manufacturing.

Synonyms

Gel foam, puragel, and gelatinum.

Source

Gelatin is a product obtained by partial hydrolysis of collagen, derived from the skin, white connective tissue, tendons, ligaments, and bones of ox (*Bos taurus* Linn.), sheep (*Ovis aries* Linn), etc.

Family

Bovidae

Organoleptic Evaluation

- 1) It is colourless or slightly yellow coloured.
- 2) It is transparent, brittle, and available in the form of sheets (figure 6.7), flakes, or coarse granular powder.
- 3) It is practically odourless and tasteless.

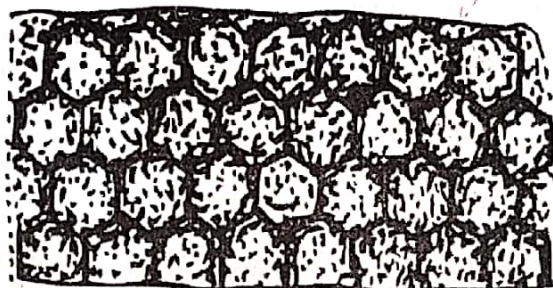


Figure 6.7: Gelatin Sheet

- 4) When kept in water, it swells and absorbs 5-10 times its weight of water and forms a gel in solutions below 35-40°C.
- 5) It is soluble in hot water, glycerol, and acetic acid; and insoluble in cold water and organic solvents.
- 6) It is amphoteric in nature.
- 7) It remains stable under dry conditions, but is attacked by bacteria when moist or in solution.
- 8) Its gelatinising property is reduced if boiled for long time.
- 9) Its quality is determined on the basis of its jelly strength (or bloom strength) using a bloom gelometer.
- 10) Commercially gelatin is available in two types, i.e., **gelatin A** and **B**.
- 11) The isoelectric point for type A lies between pH 7 and 9.
- 12) Type A is incompatible with anionic compounds (acacia, agar, and tragacanth).
- 13) The isoelectric point for type B lies between pH 4.7 and 5.
- 14) Type B is used with anionic mixtures.

Chemical Constituents

Gelatin consists of **gluten** protein which hydrolyses into a mixture of amino acids. The amino acid mixture contains **glycine** (25.5%), **alanine** (8.7%), **valine** (2.5%), **leucine** (3.2%), **isoleucine** (1.4%), **cystine** and **cysteine** (0.1%), **methionine** (1.0%), **tyrosine** (0.5%), **aspartic acid** (6.6%), **glutamic acid** (11.4%), **arginine** (8.1%), **lysine** (4.1%), and **histidine** (0.8%). From a nutritional point of view, gelatin is an incomplete protein as it lacks tryptophan. The gelatinising compound is known as **chondrin** and the adhesive nature of gelatin is due to the presence of gluten.

Chemical Tests

- 1) On heating 1gm of gelatin with soda lime, a smell of ammonia is produced.
- 2) Gelatin solution is prepared by dissolving 0.5gm of gelatin in 10ml of water. On adding a few drops of 10% tannic acid in this solution, white buff coloured precipitate is formed.
- 3) On treating gelatin with picric acid, a yellow coloured precipitate is formed.
- 4) On treating gelatin with mercuric nitrate, a white coloured precipitate is formed which turns to brick red colour when warmed.

Therapeutic Efficacy

- 1) It is used in the preparation of pastilles, pastes, suppositories, capsules, pill-coatings, and gelatin sponge.
- 2) It is used as a suspending agent, tablet binder, coating agent, stabiliser, thickener, and texturiser in food.
- 3) It inhibits crystallisation in bacteriology for preparing cultures.
- 4) It is used as a substitute for blood plasma.
- 5) It is also used for microencapsulating drugs in which the drug is sealed within a micro-sized capsule or beadlet, which may then be handled as a powder.
- 6) Glycerinated gelatin (gelatin treated with glycerine) is used as a vehicle and for manufacturing suppositories.
- 7) Zinc gelatin (gelatin treated with zinc) is used as a topical protectant.