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PHARMACEUTICAL AIDS

AGAR

Synonym : Agaragar, Japanese Isinglass, Vegetable gelatin.

Biological Source : It is the dried gelatinous substance obtained by extraction with water from *Gelidium amansii* or various species of red algae like *Gracilaria* and *Pterocladia*.

Family : Gelidaceae (*Gelidium* and *Pterocladia*),
Gracilariaceae (*Gracilaria*).

Geographical Source :

Japan ,Australia, New Zealand, Korea, South Africa, United States, Chile, Spain, and Portugal.

Morphology :

Colour	Yellowish white to gray or colourless
Odour	Slight/odourless
Taste	Mucilaginous
Shape	Strips, flakes or coarse powder
Size	Strips are about 60 cm in length and 4 mm wide. Wide sheets are 50–60 cm long and 10–15 cm wide
Solubility	Insoluble in organic solvents, cold water but soluble in hot water and forms a gelatinous solution after cooling the hot solution.



Chemical Constituents :

- Agar is a complex heterosaccharide and contains two different polysaccharides known as **agarose** and **agaropectin**.
- Agarose is neutral galactose polymer and is responsible for the gel property of agar. It consists of D-galactose and L-galactose unit.
- Agaropectin consists of sulphonated polysaccharide in which galactose and uronic acid are partly esterified with sulphuric acid. Agaropectin is responsible for the viscosity of agar solution.

Chemical Tests :

1. Agar responds positively to Fehling's solution test.
2. Agar gives positive test with Molisch reagent.
3. Aqueous solution of agar (1%) is hydrolysed with concentrated HCl by heating for 5–10 min. On addition of barium chloride solution to the reaction

mixture, a white precipitate of barium sulphate is formed due to the presence of sulphate ions. This test is absent in case of starch, acacia gum and tragacanth.

4. To agar powder a solution of ruthenium red is added. Red colour is formed indicating mucilage.

5. Agar is warmed in a solution of KOH. A canary yellow colour is formed.

6. An aqueous solution of agar (1%) is prepared in boiling water. On cooling it sets into a jelly.

7. To agar solution an N/20 solution of iodine is added. A deep crimson to brown colour is obtained (distinctive from acacia gum and tragacanth).

8. To a 0.2% solution of agar an aqueous solution of tannic acid is added. No precipitation is formed indicating absence of gelatin.

9. Agar is required to comply with tests for the absence of *E. coli* and *Salmonella*, and general microbial contamination should not exceed a level of 10³ microorganisms per gram as determined by a plate count. It has a swelling index of not less than 10.

Uses

- Agar is used to treat chronic constipation, as a laxative, sus-pending agent, an emulsifier, a gelating agent for suppositories, as surgical lubricant, as a

tablet excipient, disintegrant, in production of medicinal encapsulation and ointment and as dental impression mold base.

- It is extensively used as a gel in nutrient media for bacterial cultures
- As thickening agent in food especially confectionaries and dairy products, in meat canning;

Substitutes and Adulterants : Gelatin and Danish agar

GUAR GUM

Synonyms : Guar gum, Jaguar gum, Guar flour and Decorpa.

Biological Source : Guar gum is a seed gum produced from the powdered endosperm of the seeds of *Cyamopsis tetragonolobus*.

Family : Leguminosae.

Geographical Source : India, Pakistan and the United States, Australia and Africa.

Morphology :

Colour	It is colourless or pale yellowish-white coloured powder
Odour	Characteristic
Taste	Gummy



Chemical Constituents :

- The water-soluble part of guar gum contains mainly of a high molecular weight hydrocolloidal polysaccharide, that is, galactomannan, which is commonly known as guaran.
- The gum also contains about 5–7% of proteins.

Chemical Tests :

1. On being treated with iodine solution (0.1 N), it fails to give olive-green colouration.
2. It does not produce pink colour when treated with Ruthenium Red solution (distinction from sterculia gum and agar).
3. A 2% solution of lead acetate gives an instant white precipitate with guar gum (distinction from sterculia gum and acacia).
4. A solution of guar gum (0.25 g in 10 ml of water) when mixed with 0.5 ml of benzidine (1% in ethanol) and 0.5 ml of hydrogen peroxide produces no blue colouration (distinction from gum acacia).

5. Aqueous solution of guar gum is converted to a gel by addition of a small amount of borax.

Uses :

- Guar gum is used as a protective colloid, a binding and disintegrating agent, emulsifying agent, bulk laxative, appetite depressant and in peptic ulcer therapy.
- Industrially, it is used in paper manufacturing, printing, polishing, textiles and also in food and cosmetic industries.

GELATIN

Synonyms : Gelfoam; puragel; gelatinum.

Biological Source : Gelatin is a protein derivative obtained by evaporating an aqueous extract made from bones, skins, and tendons of various domestic animals. Some important sources are: Ox, *Bos taurus*, and Sheep, *Ovis aries*.

Family : Bovidae

Characteristics :

Gelatin occurs as a colourless or slightly yellow, transparent, brittle, practically odourless, tasteless sheet, flakes or coarse granular powder.



Chemical Constituents :

Gelatin consists of the protein glutin which on hydrolysis gives a mixture of amino acids. The approximate amino-acid contents are: glycine, alanine, valine, leucine, isoleucine, cystine, cysteine, methionine, tyrosine, aspartic acid, glutamic acid, arginine, lysine and histidine.

Chemical Tests :

1. ***Biuret reaction:*** To alkaline solution of a protein (2 ml), a dilute solution of copper sulphate is added. A red or violet colour is formed with peptides containing at least two peptide linkages. A dipeptide does not give this test.
2. ***Xanthoproteic reaction:*** Proteins usually form a yellow colour when warmed with concentrated nitric acid. This colour becomes orange when the solution is made alkaline.
3. ***Millon's reaction:*** Millon's reagent (mercuric nitrate in nitric acid containing a trace of nitrous acid) usually yields a white precipitate on addition to a protein solution which turns red on heating.

4. *Ninhydrin test*: To an aqueous solution of a protein an alcoholic solution of ninhydrin is added and then heated. Red to violet colour is formed.
5. On heating gelatin (1 g) with soda lime, smell of ammonia is produced.
6. A solution of gelatin (0.5 g) in water (10 ml) is precipitated to white buff coloured precipitate on addition of few drops of tannic acid (10%).
7. With picric acid gelatin forms yellow precipitate.

Uses :

- Gelatin is used to prepare pastilles, pastes, suppositories, capsules, pill-coatings, gelatin sponge.
- Used as suspending agent, tablet binder, coating agent.
- Used as stabilizer, thickener and texturizer in food.