FAQ.

Q.1. What is the difference between the homoglycans and heteroglycans?

Ans: The non-sugar polysaccharides can be divided into two sub-groups which include homoglycans and heteroglycans. Homoglycans consist of identical monosaccharide units while the heteroglycans consist of unidentical monosaccharide units. The example of the former is starch, glycogen and cellulose.

Q.2. What are the major classes of heteroglycans?

Ans: The hetero glycans are generally classified into following major classes:

- Hemicelluloses.
- Gums and mucilages.
- Pectic substances
- Mucopolysaccharides.

Q.3. Define hemicelluloses.

Ans: Hemicelluloses are heterogeneous polysaccharides which are formed through biosynthetic routes different from that of cellulose. The term 'hemicellulose' is a collective term used to represent the family of arabino-xylans, gluco-mannans, galactans, and others that are found in the plant cell wall. It can be said that hemicellulose is a copolymer of different C5 and C6 sugars that exist in the plant cell wall.

Q.4. Is there any variation in the amount of cellulose present in different plants?

Ans: Yes, the amount and characterisation of hemicellulose varies with source. The composition and structure of hemicelluloses in the softwood

differs in a characteristic way from that of the hardwood. Considerable differences are also seen in content and composition between the stem, branches, roots, and bark.

Q.5. What are the chief differences between cellulose and hemicellulose?

Ans: Cellulose is made up of about 10000 pure glucose monomers, has long and unbranched polysaccharide chains that have less solubility and reactivity. On the other hand, hemicellulose has a degree of polymerisation not exceeding 200 mixed sugar monomers forming short and branched polysaccharide chains that have high solubility and reactivity.

Q.6. What are the similarities between gums and mucilages?

Ans: Gums and mucilages have similar hydrophilic constituents and on hydrolysis yield a mixture of sugars and uronic acids. These combine with water to form viscous solutions or gels. The similarities between gums and mucilages can be summed up as under:

- Both are hydrocolloids.
- Both are translucent amorphous substances and polymers of a mixed monosaccharide.
- Both have uronic acids in their molecular structure.

Q.7. Classify the gums and mucilages on basis of their source.

Ans: On the basis of source, gums and mucilages can be classified as:

a) Marine origin/algal (seaweed) gums: These include agar, carrageenans, alginic acid and laminarin.

b) Plant origin: These include those obtained from shrubs or tree exudates in the form of exudate gums like arabica, gum ghatti, gum karaya and gum tragacanth. The second important category is of seed gums like guar gum and locust bean gum. The pectin and larch gums are also extracted from plant sources.

c) Animal origin: Chitin, chitosan, chondroitin sulphate and hyaluronic acid

are common gums and mucilages obtained from animal sources.

d) Microbial origin (bacterial and fungal): Common gums and mucilages obtained from microbial sources are xanthan, dextran, curdian, pullulan, zanflo, emulsan, Baker's yeast glycan, schizophyllan, lentinan, krestin and scleroglucan.

Q.8. List the applications of gums and mucilages in food industry.

Ans: Gums and mucilages have a variety of applications in the food industry. Different gums have different uses like water retention and stabilization (guar and locust bean gum), stabilization for ice-cream, meat products and instant puddings (carrageenanas), dairy, confectionary beverages, baked product, and sauces (gum arabic, tragacanth, pectins, alginates and xanthan gum).

Q.9. List some chief advantages of gums and mucilages for their practical utility in different industries.

Ans: The advantages of gums and mucilages which make their place for industrial applications are:

a) These biodegradable and renewable.

b) These are biocompatible and non-toxic.

c) Their production cost is much lower compared to that of synthetic materials.

d) These are environmental-friendly

Q.10. What are pectins.

Ans: Pectins are polysaccharides occurring in all plants primarily in their cell walls. They act as intracellular cementing material that gives body to fruits and helps them keep their shape. When fruit becomes over ripe, the pectin is broken down into its monosaccharide constituents. As a result, the fruit becomes soft and loses its firmness.

Q.11. Differentiate between low methoxyl and high methoxyl pectins?

Ans: Pectins are broadly classified into two categories, that is, high methoxyl pectins and low methoxyl pectins. If degree of esterification in pectin chains is greater than 50%, it is called a high methoxyl pectin (HM pectin) while if the degree of esterification in pectin chains is less than 50%, it is a low methoxyl pectin (LM pectin).

Q.12. What are the different conditions employed for the extraction of pectins?

Ans: Pectins are industrially extracted from citrus peels and apple pomace by hot acidified water. Extraction conditions of pH 1.5 to 3.0 and temperatures of 60 to 100 □C for 0.5 to 6 hours are varied to give the pectin of desired gelling capacity and degree of methylation.

Q.13. What are mucopolysaccharides?

Ans: Mucopolysaccharides are the heteroglycan molecules also called as glycosaminoglycans. These are complex carbohydrates which contain amino sugars and uronic acids, and constitute the mucous secretions of animals. They are acidic in nature and may be rich in sulphate ester groups. Some examples are chondroitin sulphate, heparin and hyaluronic acid.

Q.14. What is heparin?

Ans: Heparin is a potent anti-coagulant present in blood vessels, liver, lung and spleen. It is produced in the Mast Cells and causes anti-thrombin to bind thrombin causing inhibition of blood coagulation.

Q.15. What are the functions of dermatan sulphate?

Ans: Dermatan sulphate is found in skin, vessels, heart and lungs. The functions are mainly related to coagulation and prevention of vascular diseases.