GSA (Food Sciences)

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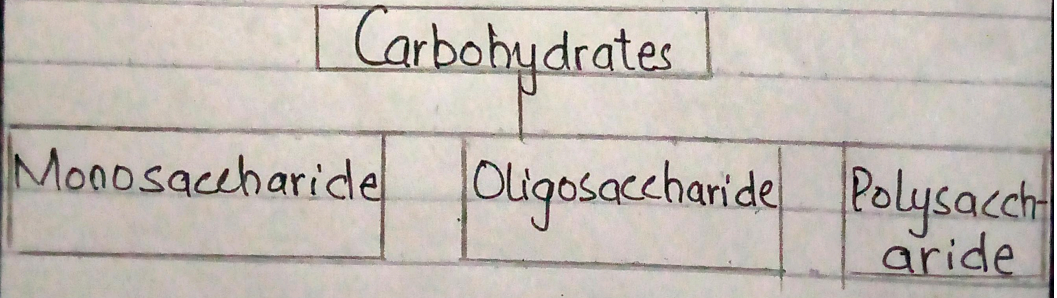
Assignment #2: Types / Classification of Carbohydrates, Proteins, Fats.

1- Carbohydrates:-
→ hydraled carbons
→ Polyhydroxy aldehydes & ketones.

Use full sentences.

Classification / Types of Carbohydrates:
→ Monosaccharide
→ Oligosaccharide
→ Polysaccharide



→ Monosaccharide (Mono = 1 saccaride = sugar).
→ Simplest sugars
→ basic units from which other carbohydrates are formed.
→ Properties
→ Colourless
→ sweet in taste
→ Water soluble

→ Crystalline solids.
→ Can't hydrolyzed into simple sugars.
→ General formula
- $C_n(H_2O)_n$

Draw pictorial representation as well.

→ Types:
- Triose (e.g; Glyceraldehyde)
- Tetrose (e.g; Erythrose, Therose)
- Pentose (e.g; Ribose, deoxyribose)
- Hexose (e.g; Glucose, fructose)

→ Oligosaccharide :-
→ formed by combination of two or more monosaccharides by glycosidic linkage.
→ **Properties:-**
→ Colourless
→ Less sweet
→ Less water soluble
→ yields two or more monosaccharides on hydrolysis.

→ **General formula:-**
- for disaccharides $C_n(H_2O)_{n-1}$
- for trisaccharides $C_n(H_2O)_{n-2}$

and so on.

→ Types:
- Disaccharide (e.g; sucrose, lactose)
- Trisaccharide (e.g; Reffinoze).
- Tetrasaccharide (e.g; stachynose)

and so on.

→ Polysaccharides:- (Poly = many)
→ Polymers of many monosaccharides.
→ Macromolecules.
→ Properties:
→ Tasteless
→ Sparingly water soluble
→ Abundant in nature
→ Usually branched or unbranched.
→ Storage and building material.

→ General formula:-
- $(C_6H_{10}O_5)_n$

→ Types:-
- Homopolysaccharide
  e.g; Starch, glycogen.
- Heteropolysaccharide
  e.g; Agar, Peptidoglycan.

2- Protiens:-

→ Chief builders of the body

→ Complex molecules of carbon hydrogen, oxygen, nitrogen (sometimes sulfur and phosphorus also).

Classification of Proteins / Types of proteins:-

→ On the basis of structure:-

- Four types

➢ Primary structure:-

→ linear sequence of amino-acids in polypeptide chain.

→ particular arrangement.

→ non-fuoctional proteins.

➢ Secondary structure.

→ formed by folding or coiling of polypeptide chain through Hydrogen bonding.

→ Repeating pattern of H-bonds between amino-acids

e.g:- Keratin, Silk fibres etc.

▲ Tertiary structure:-
→ formed by folding of helix or sheets into a three dimensional shape
→ Irregular structures between side chains of amino acids.
→ Two types of forces involved i.e; Hydrophobic interactions and Disulphide bridg

▲ Quaternary structure:-
→ formed by aggregation of two or more polypeptide chains.
→ aggregation of such polypeptide chain forms one functional macromolecule.
→ polypeptide chain called subunit of protein
e.g.- Collagen, haemoglobin

→ On the basis of Biological Function:-

▲ Enzymatic proteins:-
→ most varied and highly specialized proteins with catalytic activity.
→ Enzymes catalyze a variety of reactions.

e.g.- urease, catalgze, cytochrome C etc

▷ Structural proteins:-
→ aid in strengthning or protecting biological structure.
e.g.- collagen, elastin, keratin. etc

▷ Transport / Carrier proteins:-
→ help in the transport of ions or molecules into the body.
e.g.- Myoglobin, Haemoglobin.

▷ Nutrient and storage proteins:-
→ Provide nutrients to growing embryo and store ions.
e.g.- Albumin.

3- Lipids:-

→ known as oils or fats.
→ non-polar organic ~~compound~~ molecules insoluble in polar water, soluble in polar organic solvents.
→ high proportion of C-H bonds.

Classification / Types of Lipids:-

→ three types of fats.

- **Saturated fats:-**
  - → Solid fats as solid at room temperature.
  - → carbon atoms joined by single carbon-carbon bond.
  - → each carbond binds to many hydrogen atoms.
  - → can raise the cholestrol level in the body.
  - → less than 10% of daily calories from saturated fats in healthy diet.

    e.g.- cheese, milk, meat etc.

- **Unsaturated fats:-**
  - → Liquid at room temperature.
  - → carbon-carbon double bonds exists
  - → Chains bend at double bond.
  - → low melting points.
  - → mostly oils from plants.
  - → helps improve cholestrol levels.
  - → Types:-
    - Monounsaturated fat

      fatty acid with one double bond
    - Polyunsaturated fat

      fatty acid with numerous double bonds.

Work on structure.

Use full sentences and paragraphs.

- Trans fats:-

→ fats changed through process of hydrogenation.

→ this process increases shelf life of fats, makes fat harder at room temperature.

→ can increase cholestrol, so intake should be little.

found in:-

Cookies, Processed food etc