

CHEMICAL ANALYSIS

BIOMOLECULES

* **ORGANIC** : Tissue + CH_3COOH → grind → slurry → filter

* **INORGANIC** : Tissue → wet wt → dry wt → Combustion of C → Ash

POLYMER

- Polysaccharides
- Proteins
- Nucleic acid

MONOMER

- Sugars
- Amino acid
- Nucleotide

ELEMENTS 96%

LIVING > NON LIVING

O > C > N > H

CELL COMPONENTS

H > P > N > C > L > I

PRIMARY

SECONDARY

RETENTATE

- Acid insoluble
- 10,000 Da
- Biomacromolecule

FILTERATE

- Acid soluble
- 80-800 Da
- Biomicromolecules

CARBOHYDRATES

[CHO]

- Acid insoluble
- long sugar chains
- Hydrate of Carbon $[\text{C}_n\text{H}_{2n}\text{O}_n]$
- Simplest - Monosaccharides

* **CELLULOSE** → Homopolymer

* **FRUCTOSE** → Inulin (polymer)

* **SUCROSE** → glucose + fructose (non-reducing sugar)

* **LACTOSE** → glucose + galactose (Reducing sugar)

Oligosaccharide < 9, > 2

Polysaccharide > 9

eg - glycogen

non-reducing end

Reducing end

I₂ → [Blue]

can hold I₂

Blue black colour

GLYCOGEN - Animal starch

formed by liver

Stored in liver + muscles

[Rxn with I₂ → Bright Red Colour]

Cellulose - no complex helices → cannot contain I₂

CHITIN Monomer - NAG [N-acetyl glucosamine]

Exoskeleton of Arthropods / Fungi cell wall

- Homopolymer

DISACCHARIDE α-glucose + α-glucose

↓ -H₂O

[α-1,4 glycosidic bond]

MALTOSE

STARCH - store house of energy (Glucan)

Forms

Amylose - 200-1000 st-chain

Amylopectin - 2000-2 lakh

Helical 2° structure - Branched

Blue black colour

can hold I₂

GLYCOGEN - Animal starch

formed by liver

Stored in liver + muscles

[Rxn with I₂ → Bright Red Colour]

Cellulose - no complex helices → cannot contain I₂

CHITIN Monomer - NAG [N-acetyl glucosamine]

Exoskeleton of Arthropods / Fungi cell wall

- Homopolymer

[CHON] PROTEINS

- Acid Insoluble
- AMINO ACID - monomer
- Heteropolymer

[20] → [10] + [10]

essential non-essential

constant ↓

R - variable

Neutral Acidic Basic

Glycine Glutamic acid Arginine

Alanine Aspartic acid Histidine

Valine Lysine

[O] [-ve] [+ve]

CONH → Peptide bond

Bond

[A-A-A] Tripeptide

2-peptide bond

COLLAGEN - Most abundant in Animal world

RU B IS CO - Most abundant in whole biosphere

STRUCTURE OF PROTEIN

Primary 1°

N-terminal - A-A-A-A - C-terminal

Secondary 2°

Triple Helix

[Ramachandran]

Tertiary 3°

Quaternary 4°

eg - Hb Human Haemoglobin

TETRAMER

Hydrophobic

Hydrophilic

Weak

Strong

α₂β₂

α

β

eg - Hb Human Haemoglobin

TETRAMER

Hydrophobic

Hydrophilic

Weak

Strong

α₂β₂

α

β

eg - Hb Human Haemoglobin

TETRAMER

Hydrophobic

Hydrophilic

Weak

Strong

α₂β₂

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TETRAMER

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TETRAMER

Hydrophobic

Hydrophilic

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TETRAMER

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TETRAMER

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TETRAMER

Hydrophobic

Hydrophilic

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Weak

Strong

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