Chapter 4: Chemical Composition of The Cell.

CARBOHYDRATE

TESTS

1. Reducing Sugar Test

- Add 2ml testing solution + 2ml Benedict's solution. Heat.
  - (i) if **brick red precipitate present**, means **reducing sugar is present.**
  - (ii) if **brick red precipitate is not present**, means **reducing sugar is not present**.

1. Non-Reducing Sugar Test

- Add 2ml testing solution + 1ml dilute HCL. Heat. Cool. Add solid $NaHCO_3$ to neutralize excess acid. Add 2ml Benedict's solution. Heat.
  - (i)) **if brick red precipitate present**, means **non-reducing sugar is present**.
  - **(ii) if brick red precipitate is not present,** means **non-reducing sugar is not present**.

ELEMENTS

- C, H, O.
- ratio of H:O is 2:1

TYPES

1. Monosaccharides

- basic building blocks of carbohydrate.
-general formula : $C_6H_{12}O_6$
-simple sugar.
-sweet tasting.
-soluble in water.
-crystalline substance.
-all are reducing sugars.

Example

-Glucose, Fructose, Galactose.

2. Disaccharides

-general formula : $C_{12}H_{22}O_{11}$
-complex sugar.
- sweet tasting.
- soluble in water.
- crystalline substance.
-monosaccharide + monosaccharide $\underset{\text{hydrolysis}}{\overset{\text{condensation}}{\rightleftharpoons}}$ disaccharide + H_2O

Example

(i) glucose + glucose $\rightleftharpoons$ maltose + H_2O } reducing
(ii) glucose + galactose $\rightleftharpoons$ Lactose + H_2O } sugar

(iii) glucose + fructose $\rightleftharpoons$ sucrose + H_2O (non-reducing sugar)

3. Polysaccharides

-not sweet
-not water soluble.
-formed from the combination of more than 2 monosaccharides with the elimination of more water molecules.

Example

(i) **Starch** - major storage of carbohydrates in plants.
(ii) **Cellulose** – component of plant cell wall.
(iii) **Glycogen** - major storage of carbohydrates in animals and fungi.
(iv) **Chitin** – exoskeleton of insects.