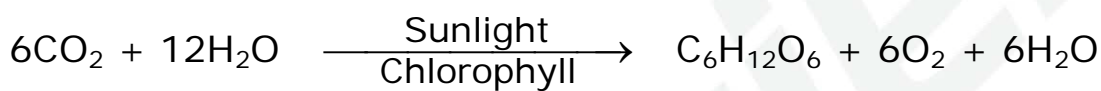


PLANT PHYSIOLOGY: PHOTOSYNTHESIS

SYNOPSIS:

Photosynthesis:

It is a biochemical process, by which all the green parts of the plant manufacture their own food, using carbon dioxide and water as raw materials, in the presence of sunlight and chlorophyll. Oxygen is released as a byproduct of photosynthesis.



Significance of Photosynthesis:

- (a) It provides food for living things directly or indirectly.
- (b) It produces oxygen.
- (c) It provides the energy present today in fossil fuels.

Essential Raw Materials and Energy for Photosynthesis:

- (1) Raw materials:
 - (a) Carbon dioxide
 - (b) Water
- (2) Energy: in the form of ATP.

Site of Photosynthesis:

Photosynthesis takes place only in the green parts of a plant, mainly leaves. The mesophyll cells in leaves have a large number of chloroplasts responsible for carbon dioxide fixation, where the process takes place.

Phases of Photosynthesis:

- (1) Light reaction
- (2) Dark reaction.

Light Reaction – Hill's Reaction:

It includes light absorption, water splitting, oxygen release and formation of high energy chemical intermediates.

Dark Reaction – Calvin Cycle:

It occurs in the stroma of chloroplasts, where the assimilatory power is used to incorporate carbon from carbon dioxide to carbohydrate.

Factors Affecting Photosynthesis:

- (1) External Factors:
 - (a) Light Intensity
 - (b) Carbon dioxide
 - (c) Temperature
 - (d) Water.
- (2) Internal Factors:
 - (a) Chlorophyll
 - (b) Accumulation of Photosynthetic Products
 - (c) Protoplasmic Factor.

Limiting Factors in Photosynthesis:

- (1) Light intensity
- (2) Carbon dioxide concentration
- (3) Temperature
- (4) Age of the leaf
- (5) Anatomy of the leaf.

Carbon Cycle:

The cyclic process in which carbon element is circulated continuously through the living and non-living components of the biosphere is called 'carbon cycle' in nature.