TENDER HEART HIGH SCHOOL

CLASS - 10 DATE - 27.01.2025

SUBJECT - BIOLOGY TEACHER- Nidhi Rana

CHAPTER - 6 PHOTOSYNTHESIS [contd.]

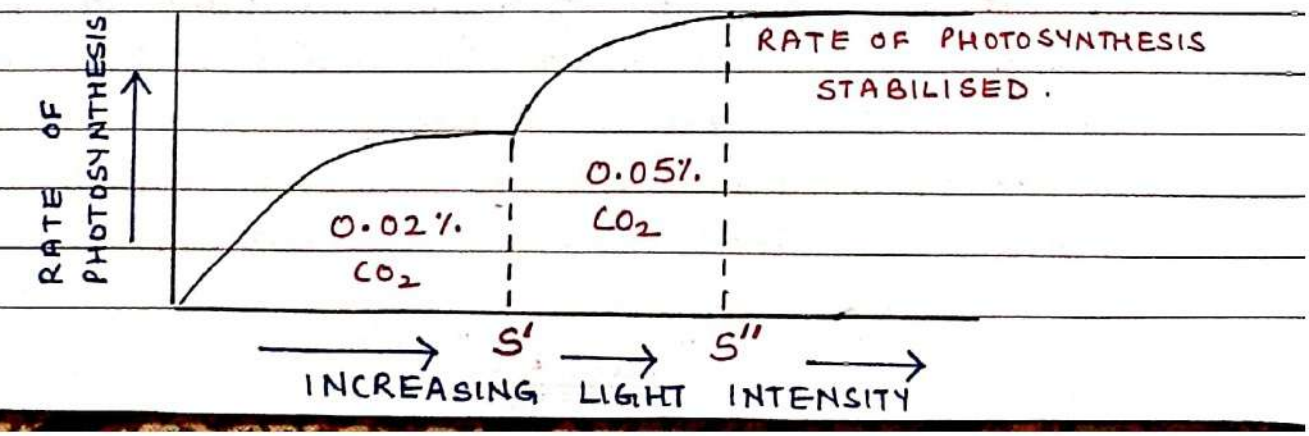
Utilisation of synthesised food and its translocation

Glucose is formed during photosynthesis very rapidly but can not be transported to all other parts with same rapidity. It is thus converted to starch for temporary storage. At night this starch is reconverted into soluble sugar and is transported (translocated) to different plant parts [where later it can be stored again eg. starch in potato]

FACTORS AFFECTING PHOTOSYNTHESIS

(i) Light intensity and (ii) Carbondioxide

If we increase the light intensity photosynthesis will increase but upto certain limit only. After that it gets stabilized (even if you keep increasing the light intensity) (as shown in point S' at 0.02% CO_2) But if at this point CO_2 concentration is increased the photosynthesis rate increases further and again gets stabalised at a point S'' at 0.05% CO_2 for the two factors together. This is because photosynthesis depends upon many factors acting together Increasing only one factor (ie. light) can not increase the photosynthesis alone. All factors are working together hence needs to be increased in similar proportion to increase the rate of photosynthesis.



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(iii) TEMPERATURE -
With rise in temperature photosynthesis rate increases upto an optimum temperature of 35°C (but stops at 40°C (as enzymes get destroyed at 40°C)
A rise of 10°C upto optimum temperature (35°C) doubles the rate of photosynthesis.

(iv) WATER CONTENT -
Scarcity of water due to transpiration reduces photosynthesis (because with less water concentration stomata gets closed leading to decreasing diffusive capacity) With less water the guard cells turn flaccid and close stomata.

INTERNAL FACTORS - AFFECTING PHOTOSYNTHESIS

(i) Chlorophyll - Loss of chlorophyll (due to nutritional deficiency) reduces trapping of solar energy Thus reduce photosynthesis.

(ii) Protoplasm - Dehydration of protoplasm or accumulation of carbohydrates reduces rate of photosynthesis.

(iii) Structure of Leaf - Thin cuticle, more number of stomata, large surface area of leaf - all these features help in trapping more amount of light and diffusing more CO_2 inside the leaf which inturn enhance the rate of Photosynthesis

EXPERIMENTS ON PHOTOSYNTHESIS

Destarching - means removal of starch from the leaves. Hence leaves are free from stach.
Destarching is done by keeping a plant in the dark for 24-48 hours to destarch the leaves All the starch from the leaves is removed and stored in the storage organs. This is done to ensure that any stach that is formed is formed during the experiment and

no starch was present before the conduction of experiment in the leaf.

To test the leaf for starch (Iodine test)

Read and understand the steps of Iodine test (Pg 74) as described in your text book and answer the following questions - Assignment I

(i) Why is the leaf dipped in boiling water?
(ii) Why is the leaf dipped in methylated spirit?
(iii) Why is the leaf again dipped in hot water?
(iv) Which solution is used to test the presence of starch in leaves?
(v) What is observed as a result of starch test?

Assignment - 2

Experiment 1 - To show that chlorophyll is necessary for photosynthesis.

(Read the steps of experiment as given in the text book Page-75 and answer the following questions)

(i) What is the aim of the experiment?
(ii) What type of plants are used for the experiment? Give examples of such plants
(iii) Why is destarching of leaves important?
(iv) What is observed as a result of the experiment and why?

Assignment -3

Experiment - 2 To show that sunlight is necessary for photosynthesis (Page 75 Text book). Answer the following questions

(i) What is the aim of the experiment?
(ii) What is the purpose of covering the leaf with black paper?
(iii) What is observed as a result of the experiment Why?

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Assignment -4

Experiment 3 To show that Carbon dioxide is necessary for photosynthesis (Page 75 of text book)

Answer the following questions

(i) What is the aim of the experiments?
(ii) What is the purpose of Potassium hydroxide in the experiment?
(iii) What other substance can be used in place of KOH?
(iv) What is observed as a result of the experiment and Why?
(v) What can be the control of the experiment?

Assignment - 5

Experiment 4. To show that oxygen is produced during photosynthesis (Pg 75 of text book).

Answer the following questions -

(i) What is the aim of the experiment?
(ii) Name some plants that can be used in this experiment.
(iii) What is observed as a result of the experiment and why?
(iv) What is the test for the 'gas' evolved during the experiment?

IMPORTANCE OF PHOTOSYNTHESIS

1. It provides food for all organisms - all producers, consumers, and even decomposers
2. It provides oxygen to all living organisms on Earth for respiration

Food Chain always start from a ~~foo~~producer (Plants) Plants with help of sunlight manufacture their own food by the process of photosynthesis

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CARBON CYCLE

Series of chemical reactions / processes in which carbon as a chemical element (in CO_2) is used up and removed from the air as well as the processes that return it to the air

Various sources and sinks of Carbon in environment are discussed as below -

(i) Photosynthesis - Green plants use CO_2 to produce food.

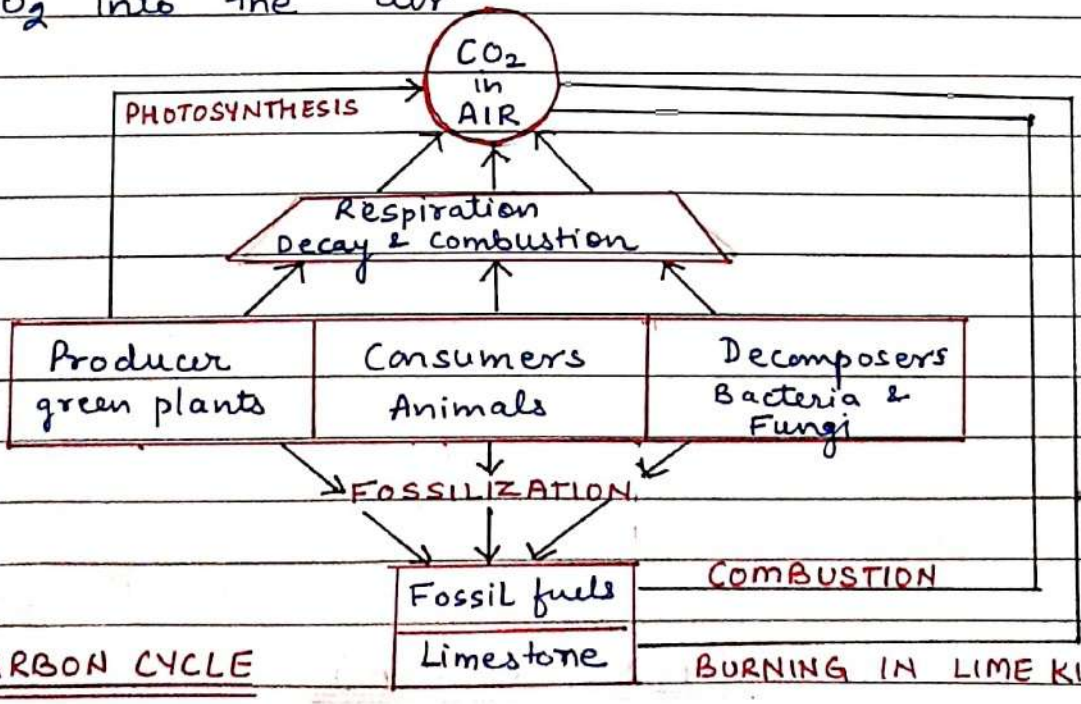
(ii) Food chains - Through food chains food (containing Carbon) passes from producers to consumers.

(iii) Respiration - Organisms during respiration break down carbohydrate (food) in their bodies and release back CO_2 in air.

(iv) Decay - When the organisms die, decomposers break down their bodies to release CO_2 in the atmosphere

(v) Combustion - Fossils fuels (formed from burial of dead plant / animals deep under the Earth) when burnt release CO_2 into the air.

(vi) Heating Limestone in lime kilns release a lot of CO_2 into the air



CARBON CYCLE

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CHAPTER - 6

TEACHER - Nidhi Rana.

NOTE FOR STUDENTS

Students are required to go through these notes as well as the 'chapter - 6' as being discussed in the text book.
It may require multiple readings to grasp the topic completely.

HOME ASSIGNMENT

1. Students are required to answer the questions as given in Assignment 1, 2, 3, 4, 5 (in these notes at Page 3 and 4) in their notebooks
2. Answer the following questions from the 'Review (exercises) questions' given at the end of the Chapter 6 -
   D. Descriptive type Q No 3
   E. Structured / Application / skill type Q No 1 & 6.