

CHAPTER - 7 RESPIRATION IN PLANTS

Good morning students,

This lesson is for Class IX for the subject of Biology.
'Respiration and its types' which is covered in Chapter 7
'Respiration in plants' starting on Page No 55 of your
text-book - Concise Biology Selina Publications

Dear students Let us begin -

CHAPTER 7 Respiration in Plants

All living organisms require energy to do work.
This energy is provided to the organisms by
the breakdown of glucose (product of digestion
of food in the body) by the process called Respiration.
Respiration is the catabolic (breaking down process)
process of releasing energy from glucose for
carrying out life processes.

Characteristics of Respiration

- 1) Respiration (Breakdown of glucose to CO_2 & H_2O) is not a single step process, but occurs in a series of chemical steps.
- 2) Two main phases of respiration -
 - a) Glycolysis in which glucose converts to pyruvate. It occurs in cytoplasm.
 - b) Krebs cycle in which pyruvate converts to $\text{CO}_2 + \text{H}_2\text{O} + \text{ATP}$. It occurs in mitochondria.
- 3) In series of chemical steps each chemical step is due to a particular enzyme.
- 4) Energy liberated during respiration is in two forms:
 - a) ATP Adenosine triphosphate - which is called the energy currency of the cell because it is the immediate source of energy available in a living cell to perform all its activities.
 - b) Heat energy.

When energy in the form of ATP is used, the ATP is converted to ADP (Adenosine diphosphate) (i.e. One phosphate is removed; bond is broken hence releases energy which is used to do work)

Again when more energy is available (after respiration by breakdown of glucose energy is released) the ADP reconverts back to ATP



Two types of metabolic activities in living organisms-

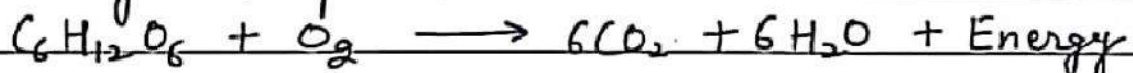
- (i) Anabolic - that consumes energy. It is constructive or biosynthetic process For eg Photosynthesis



where two smaller molecules like CO_2 and H_2O combine to form bigger molecule (i.e. $\text{C}_6\text{H}_{12}\text{O}_6$)

It consumes the energy of the sun.

- (ii) Catabolic - It gives out energy for use by the organism. It is destructive or breaking down process For Eg Respiration.



Here bigger glucose molecule is broken down to smaller $\text{CO}_2 + \text{H}_2\text{O}$ with release of energy.

Respiration Vs Burning

Similarities - (1) Both processes liberate energy

(2) Both processes give the end product as CO_2 & H_2O

Differences - (i) Respiration is a cellular process

occurring inside a cell whereas burning is non cellular

(2) Burning occurs only if the ignition temperature of that substance is achieved Respiration at body temperature

(3) Burning is a single step process Respiration occurs in series of steps

(4) For respiration to occur enzymes are required Burning is carried out by heat.

5) Respiration is a biochemical process involving a living cell/organism. Burning is a physio-chemical process involving a chemical and physical change.

6) In burning energy is released as heat and light in respiration energy is released as ATP and heat.

7) In burning light energy is produced, in respiration no light energy is produced.

Before going further let us take a short break

Answer the following questions during the break:-

Q1 Name the 2 main phases in respiration.

Q2 Give the full form of ATP

Q3 Give one example of anabolic activity in living organisms.

Break is over children. Listen to the correct answers.

A1. Glycolysis and Krebs cycle

A2 Adenosine-Tri-Phosphate

A3 Photosynthesis.

Now let us resume the topic with the discussion of plant respiration and understand that

THE entire plant respire.

It is the characteristic feature of a living organism that living cells/organisms respire

Hence all parts of a plant respire. Oxygen for respiration is obtained from atmosphere through three inlets.

- 1) Stomata - tiny holes present (usually on under surface) on leaves.
- 2) Lenticels - tiny pores present on stem (generally on bark of a tree)
- 3) General surface of the roots.

Why is ploughing/tilling of soil important?

Ploughing or tilling of soil creates tiny air spaces around the soil particles and provides the source of oxygen for roots to respire. Water logged and compact soil does not have air spaces which affect respiration of the roots.

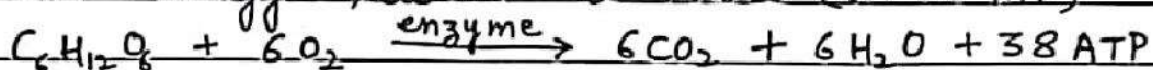
Why we should not sleep under a tree at night?

At night photosynthesis does not occur. Hence the CO_2 produced by plant is not being used by plant (as raw material for photosynthesis) and is released by plant in the air.

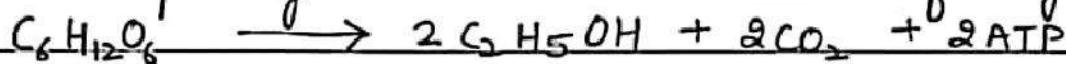
Hence at night plants release CO_2 in air and we should avoid sleeping under trees at night.

Two kinds of Respiration -

A. Aerobic Respiration is complete breakdown of glucose with the help of oxygen into carbon dioxide and water. The energy released is more (i.e. 38 ATP).



A. Anaerobic Respiration is incomplete breakdown of glucose into ethanol and carbon dioxide with release of small quantity of energy (i.e. 2 ATP). This respiration is temporary and occurs in absence of oxygen.



Certain microbes such as Bacteria, Fungi normally respire only anaerobically.

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CLASS - IX BIOLOGY

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Dear Students with this I am ending
Today's discussion. Kindly go through the
given explanation and with reference to the
detailed explanation answer the following
home assignment questions in your notebooks.

HOME ASSIGNMENT

Q1. Do the following Review Questions (given on
Page 61 of your text book) in note book.

B. Very short Answer Type .

Q No. 1

C. Short Answer Type

Q No. 2, 5 and 6.

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