

Date - 05-02-2024 Department of Botany - B.Sc part-III, Home E-Copy  
online class, J.J. College Ara, Dr Sunil Pandit.

Time - 10:00-11:00 AM

Group - B, paper - D - plant pathology.

**Question** → Describe the role of enzymes in the development of plant disease or plant pathogenesis.?

**Ans** → The enzymes which are secreted by the disease producing microbes are always helpful in creating disease in the host plants. The microbes when come to host plant or animals, they secrete some enzymes which destroy the cell wall of the host and make a way to enter the microbes into the body of the host. First of all the microbes attach to the body of host and secrete hydrolytic enzyme which destroy the cell walls of the host tissues, as a result the coherence of the cells is lost. After that the pectic acid and cellulolytic enzymes are secreted which destroy the cytoplasm of the cells. Thus the microbes make the way to enter into the body of the host destroying the cells and their contents. Following are some enzyme secreted by microbes: —

1. **pectic enzyme** → The enzyme is secreted by several bacteria, monads and fungi. This enzyme may be divided into two groups.  
(A) pectinesterases (PE)  
(B) polygalacturonases (PG)
- (a) **Macerating enzymes** → protopectinases enzymes attack on protopectin substances and convert the soluble substances from insoluble one and decompose the middle lamella.
- (b) **cellulolytic enzymes** → The enzymes mainly destroy the cell walls and give nutrition to the microbes. They hydrolyse the cellulose components such enzymes are produced in sufficient quality by *Sclerotium rolfsii*.
- (c) **Hemicelluloses** → Several saprophytic acid parasitic microbes secrete this enzyme which convert them into pentoses and uronic acids. It has been observed that *Sclerotinia sclerotiorum* microbe secretes xylanase and arabinase enzymes in sunflower plant.
- (d) **Lignolytic enzymes** → The bacteria are not capable of producing such enzymes but several fungi (about 500-550) of class basidiomycetes produce these enzymes which decompose lignin.
- (e) **proteolytic enzymes** → These enzymes are produced by particular species,

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phytophthora infestans, stemphylium botryosum, Helminthosporium oryzae which hydrolyse and decompose the cell walls of host plants.

(7). Lipolytic enzymes → The enzymes are also called as lipase and phospholipase. The lipolytic enzymes decompose lipids of several bacteria, fungi and nematodes found in atmosphere.

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Date - 05-02-2024 Department of Botany - B.Sc part - II. Home E. Copy  
Online class, P.S. College, Ara, Dr. Sunil Pandey Time - 9:00 - 10:00

Group - B. paper - III - Ecology -

Question → Discuss Carbon cycle? -1-

Ans - Carbon is the most important basic element of all organic Compou  
The main source of Carbon are free Carbondioxide ( $\text{CO}_2$ ) present in nature  
dissolved  $\text{CO}_2$  in water, rocks, coal deposites and volcanic activities etc  
 $\text{CO}_2$  obtained from all these sources is present in about 0.03% in  
atmosphere. The movement of Carbon is also in cyclic order which  
involves the following main steps:

- (i) The green plants use  $\text{CO}_2$  for manufacture of food in presence of  
sunlight. During the process  $\text{CO}_2$  is fixed to form Carbohydrate and other  
organic Compounds like protein, fats etc.
- (ii) When these plants are eaten by herbivores (animals - primary Consumers)  
Some amount of it is passed onto these animals. The higher animals (secondary  
and tertiary Consumers) get their the form of food through the food chain  
system.
- (iii) All living organism (plant and animals) contribute a good amount of  $\text{CO}_2$   
to the atmosphere through respiration.
- (iv) Some proportion of organic matters contribute the formation of coal  
deposites and rocks which release  $\text{CO}_2$  to the atmosphere.

In this way Carbon moves in the nature in the form of  
 $\text{CO}_2$  to green plants (producers), then animals (Consumers), then decomposers  
bacteria fungi and other micro-organism and finally return to the  
atmosphere through the decomposition of dead organic matters.

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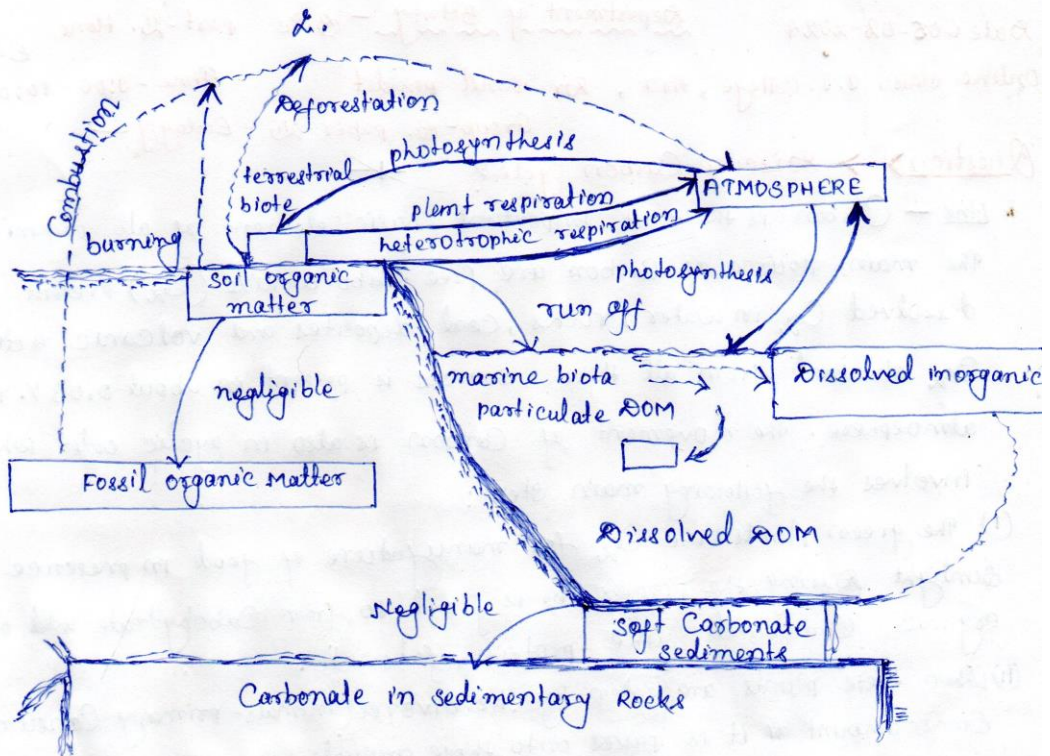


Fig - Carbon cycle.