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Key Points

Nutrition in Plants

Nutrition is the process of intaking as well as utilization of food.

Plants can make their food themselves but animals including humans cannot.

Food is the combination of organic and inorganic substances from which an organism derives energy and materials for growth and maintenance.



Modes of Nutrition

Autotrophic Nutrition

The mode of nutrition in which organisms make their own food from simple inorganic substances is called autotrophic nutrition.

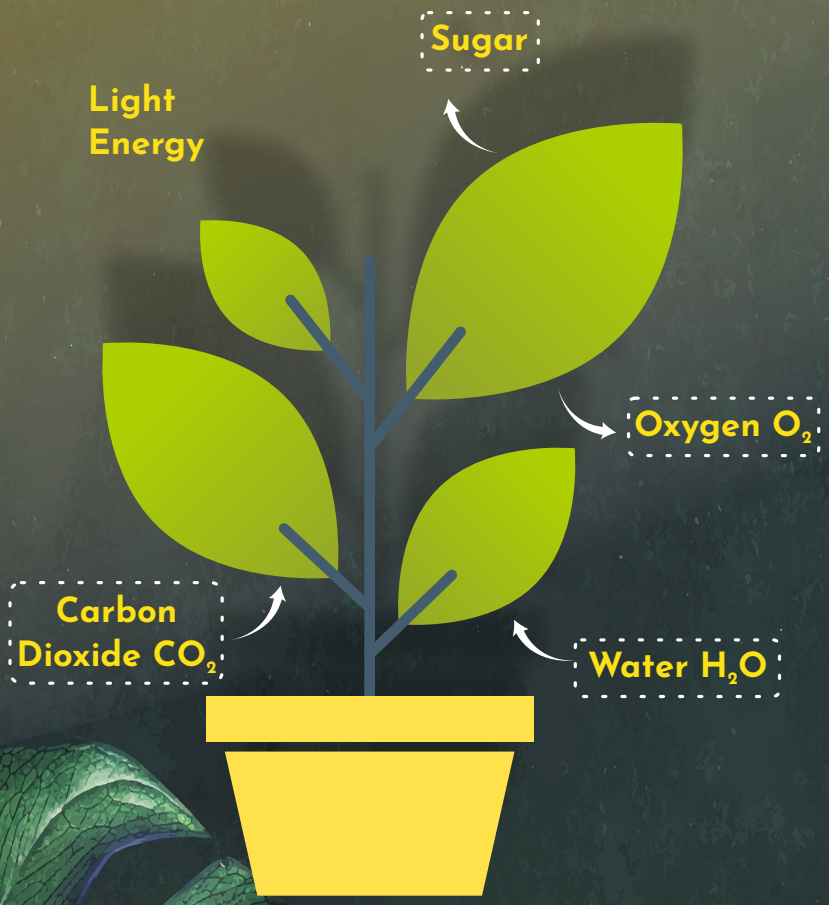
Heterotrophic Nutrition

The mode of nutrition in which organisms cannot make their own food but obtain food from other organisms such a mode of nutrition is called heterotrophic nutrition.

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Photosynthesis

Photosynthesis is the process of synthesis of organic food (glucose) from inorganic carbon dioxide and water, using solar energy captured by chlorophyll pigments.



Requirements of Photosynthesis:

SUNLIGHT

Sun is the natural source of sunlight which provides solar energy to the plant.

CHLOROPHYLL

It traps solar energy from sunlight. Chlorophyll pigment is present in all the green parts of the plant in cell organelles called chloroplast.

CARBON DIOXIDE

Carbon dioxide is obtained from the atmosphere through stomata present on the leaf surface of the plants.

WATER

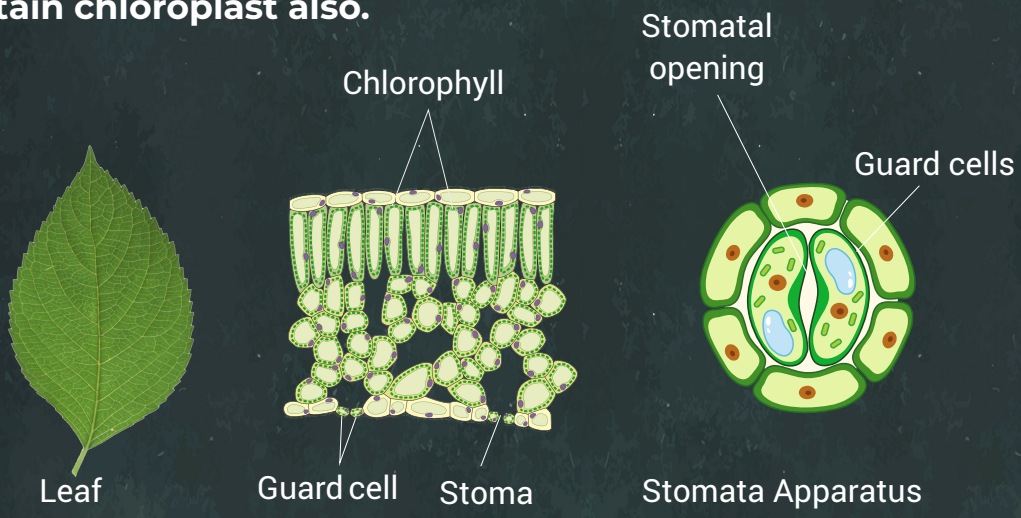
Water is also essential for photosynthesis.

CHEMICAL REACTION OF PHOTOSYNTHESIS

$$6CO_2 + 12\ H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

Role of leaf in Photosynthesis

The tiny pores present on the surface of the leaves surrounded by two kidney shaped guard cells are called stomata. Guard cells regulate the opening and closing of stomata. These are kidney shaped cells which cover single stoma. They contain chloroplast also.

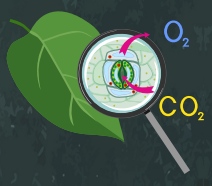


Section of a leaf

Functions of Stomata

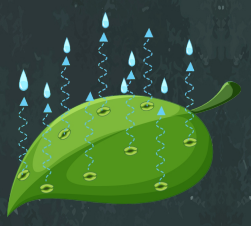


Exchange of gases



Exchange of gases take place (carbon dioxide from air is taken in and oxygen is released) through stomata.

Transpiration



Transpiration takes place through stomata. Transpiration is the process of loss of water in a vapour form from aerial parts of plants.

Synthesis of food other than carbohydrates

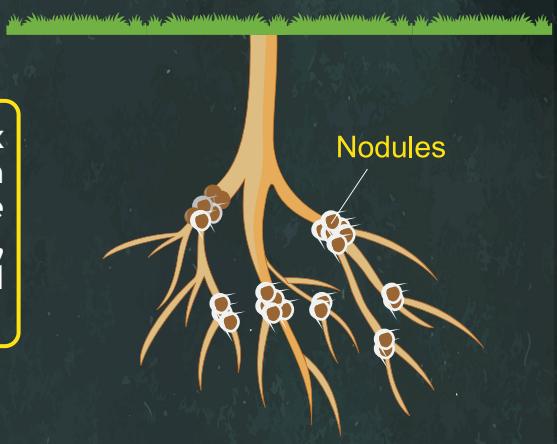
Plants synthesize carbohydrates. The carbohydrates are made up of carbon, hydrogen and oxygen which are used to synthesize proteins and fats. But proteins are nitrogenous substances which contain nitrogen. Plants cannot absorb nitrogen form Air. They get nitrogen in two ways.

- Soil has certain bacteria that convert gaseous nitrogen into a usable form and release it into the soil. These soluble forms are absorbed by the plants along with water.
- Farmers add fertilizers rich in nitrogen to the soil by which plants fulfill their requirements of nitrogen along with the other constituents.

Replenishing nutrients in the soil

Plants absorb mineral nutrients from the soil. So, their amount in the soil keeps on declining. Fertilizers and manures contain plant nutrients such as nitrogen, potassium, phosphorus, etc. Usually crops require a lot of nitrogen to make proteins. After the harvest, the soil becomes deficient in nitrogen. They need nitrogen in a soluble form.

The bacterium called *Rhizobium* can fix atmospheric nitrogen and convert it into a soluble form, but *Rhizobium* cannot make its own food. So, it lives in the roots of gram, peas, moong, beans and other legumes and provides them with nitrogen.



OTHER MODES OF NUTRITION IN PLANTS

Other modes of nutrition in plants



SAPROTROPHIC NUTRITION

Mode of nutrition in which organisms take their food in the form of solution from dead & decaying matter is called saprotrophicnutrition.

E.g. : Mushroom
Bread moulds



PARASITIC NUTRITION

There are certain plants which lack chlorophyll pigments (without which photosynthesiscannottakeplace)andarethus parasites on other plants. These plants obtain the food prepared by other organisms.

E.g. : Cuscuta (Dodder),
Rafflesia, etc.



SYMBIOTIC RELATIONSHIP

Mutually beneficial association in which two organisms live together and share shelter and nutrients. This iscalledsymbioticrelationship.

E.g. : Mycorrhiza
and Lichen.



CARNIVOROUS PLANTS

Insectivorous plants are autotrophic but obtain nitrogen from insects. They generally grow in the soil deficient in nitrogen. Insectivorous plants are partial heterotrophs.

E.g. : Nepenthes or Pitcher plant,
Venus flytrap, Sundew etc.

Mycorrhiza : The symbiotic association of the mycelium of a fungus with therootsofcertainplants(conifersandorchids). The tree provides nutrients to the fungus and in return, receives help from it in taking up water and nutrients from the soil.

Lichens : Association in which a chlorophyll-containing partner (alga), and a fungus live together. The fungus provides water and minerals to the alga and in return, the alga provides food which it prepares by photosynthesis.