

➤ Mode of Nutrition in Bacteria

Like other organisms, bacteria also need nutrition and energy for growth and other vital activities.

On the basis of mode of nutrition, bacteria are divided into 2 groups:

1. Autotrophic bacteria
2. Heterotrophic bacteria

1. **Autotrophic bacteria**

Those bacteria which can prepare their food from inorganic compounds such CO_2 and ions like carbonates, bicarbonates, nitrates and sulphates etc are called autotrophic bacteria.

The autotrophic bacteria are further divided into 2 groups:

- i. Photoautotrophs

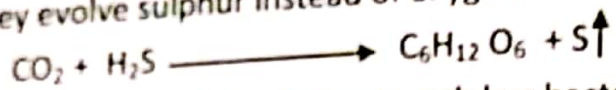
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ii. Chemioautotrophs

i. Photoautotrophs

They possess chlorophyll but not present in chloroplast but dispersed in the infolded region of membrane in cytoplasm. The process of photosynthesis in these bacteria is different from other green plants in two aspects.

- They use hydrogen sulphide (H_2S) instead of water as hydrogen source.
- They evolve sulphur instead of oxygen.



Examples: purple sulphur bacteria, sulphur bacteria, purple non sulphur bacteria.

ii. Chemoautotrophs

They derive their energy from oxidation of inorganic substances such hydrogen sulphide (H_2S), ammonia (NH_3), Nitrates (NO_3^-), nitrites (NO_2^-), sulphur dioxide (SO_2) and iron compounds Ferric oxide (Fe_2O_3) etc.

Such bacteria are of great importance as they play a vital role in biogeochemical cycle e.g. *Nitrobacter*, *Nitrosomonas* etc.

2. Heterotrophic bacteria

Those bacteria which can't synthesize their own food from simple inorganic nutrients and get their food from other organisms are called heterotrophic bacteria.

Heterotrophic bacteria are classified into 3 groups:

- Saprophytic bacteria
- Parasitic bacteria
- Symbiotic bacteria

i. Saprophytic bacteria

These bacteria are commonly known as saprobes.

Saprobes feed exclusively on dead organic matter of plants and animals. They produce powerful enzymes with the help of which they decompose the complex dead organic materials into simpler substances. During this process energy is released used by these saprobes for different activities.

The decomposition carried by saprobes is very important in two aspects.

- They act as recycle and recycle important nutrient used by living organism again i.e. biogeochemical process.
- They decompose the dead bodies and remove them from the surface of earth and keep clean the earth.

ii. Parasitic bacteria

Such bacteria get food from living host and cause break down of host's cells by the production of poisonous substances in host. The result of these activities appears in the form disease. Disease causing bacteria are called pathogenic bacteria or simple pathogens e.g. *Hameophilus*, *Streptococcus*, *Pneumococcus*, *Clostridium* and *Bacillus* etc.

iii. Symbiotic bacteria: Sym = together biosis = living

Some bacteria live in symbiotic relationship with other living organisms. Symbiosis is useful nutritional association between two different living organisms.

Symbiosis is of two types:

- a. Mutualism
- b. Commensalism
- a. Mutualism

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It is a type of symbiosis in which both partners are mutually benefited e.g. *Rhizobium* bacterium found in root nodule of leguminous plants. *Rhizobium* converts atmosphere nitrogen into bound nitrogen (nitrate etc) while in turn plant provides shelter and food to the *Rhizobium*.

b. Commensalisms:

It is a type of symbiosis in which one partner is benefited while the other one is neither benefited nor harmed.

➤ Comparison of photosynthesis in Bacteria and Cyanobacteria

	Bacteria	Cyanobacteria
1. Evolution of O ₂	Evolution of O ₂ does not occur.	Evolution of O ₂ occurs.
2. Source of Hydrogen	H ₂ S	H ₂ O
3. Photosynthetic pigments	Bacteriochlorophyll	Chlorophyll "a", Phycocyanin, Allophycocyanin, Phycoerythrin
4. Photosystems	The sole source of energy i.e. ATP and NADPH ₂ in photosystem-I	Both photosystem-I and photosystem-II are involved.