**Nutrition of Bacteria**

**Nutrition**: is a process by which organisms acquire chemical substances (Nutrients) used in cellular activities such as metabolism and growth. Organisms differ in the use of particular elements, their source and chemical form

Most bacteria are heterotrophic, living off other organisms. Most of these are saprobes, bacteria that live off dead organic matter. The bacteria that cause disease are heterotrophic parasites. There are also many non-disease-causing bacterial parasites, many of which are helpful to their hosts. These include the "normal flora" of the human body.

Autotrophic bacteria manufacture their own food by the processes of [photosynthesis](http://www.infoplease.com/encyclopedia/science/photosynthesis.html)and [chemosynthesis](http://www.infoplease.com/encyclopedia/science/chemosynthesis.html) .. The photosynthetic bacteria include the green and purple bacteria and the [cyanobacteria](http://www.infoplease.com/encyclopedia/science/cyanobacteria.html). Many of the thermophilic archaebacteria are chemosynthetic autotrophs.

**Autotrophic Bacteria**

Autotrophs are bacteria which obtain their nutrition from inorganic compounds. Carbon dioxide is typically the sole source of cellular carbon. Autotrophs will use hydrogen sulfide, ammonia or hydrogen gas to reduce carbon into necessary sugars. Nitrifying bacteria, which oxidize ammonia to create nitrites and nitrates, are an example of bacteria which use autotrophic nutrition.

These bacteria can be distinguished further into two types as follows:

**1-Photoautotrophic Bacteria**

The **photoautotrophic bacteria** possess photosynthetic pigments in membrane bound lamellae (or thylakoids) and utilize solar energy. The bacterial photosynthesis is different from that of green plants since here water is not used as a hydrogen donor. Hence oxygen is not released as a byproduct. For this reason, the process is described as an oxygenic photosynthesis.

**equation of anoxygenic photosynthesis**

**2-Chemosynthetic Bacteria**

These are bacteria which manufacture organic compounds from inorganic raw materials utilizing energy liberated from the oxidation of inorganic substances. Following are the common types of chemo autotrophic bacteria.

1. Nitrifying bacteria which derive energy by oxidizing ammonia into nitrates. ex: Nitrosomonas, Nitrobacter.

**equation of energy formation by nitrifying bacteria**

2. Sulphur bacteria which derive energy by oxidising hydrogen sulphide to sulphur.ex: Thiobacillus, Beggiatoa.

**equation of energy formation by sulphur bacteria**

3. Iron Bacteria which derive energy by oxidising ferrous ions into ferric form. ex: Ferrobacillus, Gallionella.

**equation for energy formation by iron bacteria**

**Heterotrophic Bacteria**

Bacteria that require organic sources of carbon such as sugars, fats and amino acids are termed heterotrophs. Saprophytic bacteria are an example. They attain their nutrition from dead organic matter. Using enzymes, these bacteria will braked own complex compounds and use the nutrients to release energy. Saprophytic bacteria are essentially decomposers and play an important role in ecosystem by releasing simpler products which plants and animals can use.

**Symbiotic Bacteria**

These are bacteria which live in a mutually beneficial association with other organisms. Such bacteria derive the essential nutrients from their host organisms and in that process help the host through some of their biological activities.

1. The most familiar example of symbiotic bacteria are the nitrogen fixing bacteria found in the root nodules of leguminous plants. Bacteria such as Rhizobium and Pseudomonas reside in the root nodules and reduce atmospheric nitrogen directly to ammonia. This becomes the source of nitrogen for the host plants. The plants in return provide bacteria with nutrients and protection.

2. The bacteria found in the human alimentary canal Escherichia coli are nonpathogenic. These bacteria check the growth of harmful putrefying bacteria. In addition, these bacteria release vitamins K and B12 which are necessary for blood components. The human host provides shelter and food for these bacteria.

3. A similar example is that of cellulose digesting bacteria which occur in the alimentary canal of ruminant mammals such as cows and goats.

**Parasitic Bacteria**

These are bacteria which occur in the body of animals and plants, obtaining their organic food from there. Most of these bacteria are **pathogenic**, causing serious diseases in the host organisms either by exploiting them or by releasing poisonous secretions called toxins.

Bacteria, like all living cells, require energy and nutrients to build proteins and structural membranes and drive biochemical processes. Bacteria require sources of carbon, nitrogen, phosphorous, iron and a large number of other minerals. Carbon, nitrogen and water are used in highest quantities. The nutritional requirements for bacteria can be grouped according to the carbon source and the energy source.