

# Microbial Nutrition and Growth

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## ABSTRACT

For the nutrition the microorganisms three main ingredients carbon, energy, and electrons. Each of these items have specific times associated with the organism. The other forms of energy to the microorganisms are light energy or chemical energy. The sun produces the light energy. Whereas the chemical energy is produced by the either organic or inorganic substances. The microorganisms that use the light energy are called as phototrophs. The organisms that use chemical energy are termed as chemotrophs.

## MICRONUTRIENTS

Along with the above-mentioned ingredients the cells of the microorganisms also require additional elements in sufficient quantity. These include nitrogen to produce proteins, nucleic acids and other cell components. Phosphorous as it is the crucial component of nucleic acids. In addition to these, the cells also require potassium to produce enzymes, magnesium is used to stabilize the membrane sulfur for the production of amino acids.

The molecules that are essential for the growth of the microorganisms are called as growth factors and they are divided into 3 types 1) amino acids, 2) purines and pyrimidines and 3) vitamins.

The microorganisms should bring some materials from the external environment. This is carried down by special transport systems.

Active transport: in this transport the nutrients should be able to cross the membrane against the concentration gradient. For this the cells take the help of the carrier proteins from the membranes. Every active transport must take the use of carrier proteins

Primary active transport: this transport makes use of chemical energy like ATP for the transport of nutrients.

Secondary active transport: this transport uses the energy from

the proton motive factor. This is generally using during the energy conserving process.

Facilitated Diffusion: As of the active transport in this too the nutrients should cross through the membrane against concentration gradient, but these do not use the carrier proteins instead they use the permeases. These are the special proteins that are located in the cell membrane that provide a pore across the cell membrane.

Passive Diffusion: in this transport the nutrients like gases, H<sub>2</sub>O, O<sub>2</sub> etc cross the membrane. The concentration gradient even exists here but in a vice versa with higher concentration outside the membrane.

Group translocation: this transport uses the energy from the energy rich compounds (Organic).

## DIVISION OF MICROORGANISMS

The bacteria undergo asexual reproduction whereas as the eukaryotic organisms can their mode of reproduction either sexual or asexual reproduction. Most of the bacteria reproduce through some processes like binary fission: in this the single cell splits into equal halves and form two. Multiple fission: in this the cells divide into multiple daughter cells. Budding: In this process the cell divides by forming buds the buds get separated and forms a new organism. The final by the production of spores.

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