

# MICROBIOLOGY OF WATER

The drinking water of most communities and municipalities is obtained from surface sources - rivers, streams and lakes. Such natural water supplies are likely to be polluted with domestic and industrial water. Many city dwellers (whose water comes from the rivers) are not aware that a considerable portion of their drinking water may have been used earlier for domestic and industrial purposes. Water is used for bathing, washing clothes, washing utensils and flushing toilets. The domestic water consumption may vary with the availability of water. Most of the water taken into the houses may be returned as waste water through drainage system. All these waste waters contain organic and inorganic waste as suspended or dissolved matter. In addition, these waste waters contain microorganisms, including those of faecal origin and pathogenic nature. As a potential of pathogenic organisms, water can be in danger to health and life. The pathogens most frequently transmitted through water are those which cause infections of the intestinal tract, namely, typhoid and paratyphoid bacteria, dysentery (Bacillary) and cholera bacteria and viruses. The causative organisms of these diseases are present in the feces or urine of an infected person.

## Distribution of microorganisms in aquatic environment

Microorganisms occur in all depths. The surface film and bottom sediments have a high concentration of microorganisms. Drifting microbial life of aquatic environment is called *Plankton*. It is composed of Phytoplankton eg. Algae and Zooplankton. The bottom region of the body of water harbours largest number and kinds of microorganisms called benthic microorganisms.

The movement of water by wind, tide and currents affect the distribution of microorganisms up welling occurs in oceans. It is a process in which the bottom water carries with it a rich supply of nutrients and delivers it to the surface region.

## Aquatic microorganisms in ponds and lakes

The zonation and stratification of lakes and ponds influence the occurrence of microorganisms. Lakes and ponds of temperate region show thermal stratification, which influences the microbial population in different seasons. In spring and autumn mixing occurs resulting in massive growth of algae called bloom. Lakes and ponds enriched with nutrients show eutrophication. The common microorganisms found in fresh water are *Pseudomonas*, *Flavobacterium*, *Aeromonas* and *Alcaligenes*. Estuary is semi-enclosed coastal water body having connection with the open sea. It receives fresh water with all particulate suspensions through rivers. In areas receiving domestic wastes with organic nutrients contain the following organisms: *Coliforms*, *Faecal Streptococci*, *Bacillus*, *Clostridium*, *Thiothrix* and *Thiobacillus*. Soil bacteria such as *Azotobacter*, *Nitrosomonas* and *Nitrobacter* are also found in water. The very classes of fungal or

*Ascomycetes*, *Phycomycetes* and *Fungi-imperfecti* are also present in water.

## Aquatic microorganisms in the sea

The sea is the largest natural environment inhabited by microbes. Bacteria, algae, protozoa, molds and yeast are major groups of microorganisms found in the sea. The number of microorganisms is more in coastal waters and it gradually decreases in the open sea.

In sea, phytoplanktons form group of microorganisms which convert radiant energy into chemical energy and which support the entire population of fishes eg. *Diatoms*, *Cyanobacteria*, *Dinoflagellates*, *Chryomonads* and *Chlamydomonas*.

## **Importance of aquatic microbes**

Aquatic microorganisms, both plants and animals, interact among themselves and between microorganisms. Algae, protozoa and other phytoplankton play key role in the food chain in water and certain organisms perform photosynthesis. They are called primary producers in an aquatic ecosystem. Bacteria and other fungal organisms also play an important role in biogeochemical transformation in soil.