are also unlike the true fungi in that they have tubular mitochondria cristae.

Oomvcota means "egg fungi." a reference to the mode of sexual reproduction in water molds.

Nutrition and Habitat:

Saprotrophs:

Water molds such as *Saprolegnia* and *Achlya* are saprophytes that grow as cottony masses on dead algae and small animals, mainly in freshwater environments.

Decomposers:

They are important decomposers in aquatic ecosystems.

Parasites:

Some water molds are parasitic on the gills of fish.

Diseases:

1-The water mold *Peronospora hyoscyami* is currently responsible for the troublesome "**blue mold**" of tobacco plants throughout the world producing millions of dollars of damage yearly to tobacco crops.

2-Other oomycetes cause late blight of potatoes and grape downy mildew.

Microbiology of Water

There are two major types of water.

Ground water

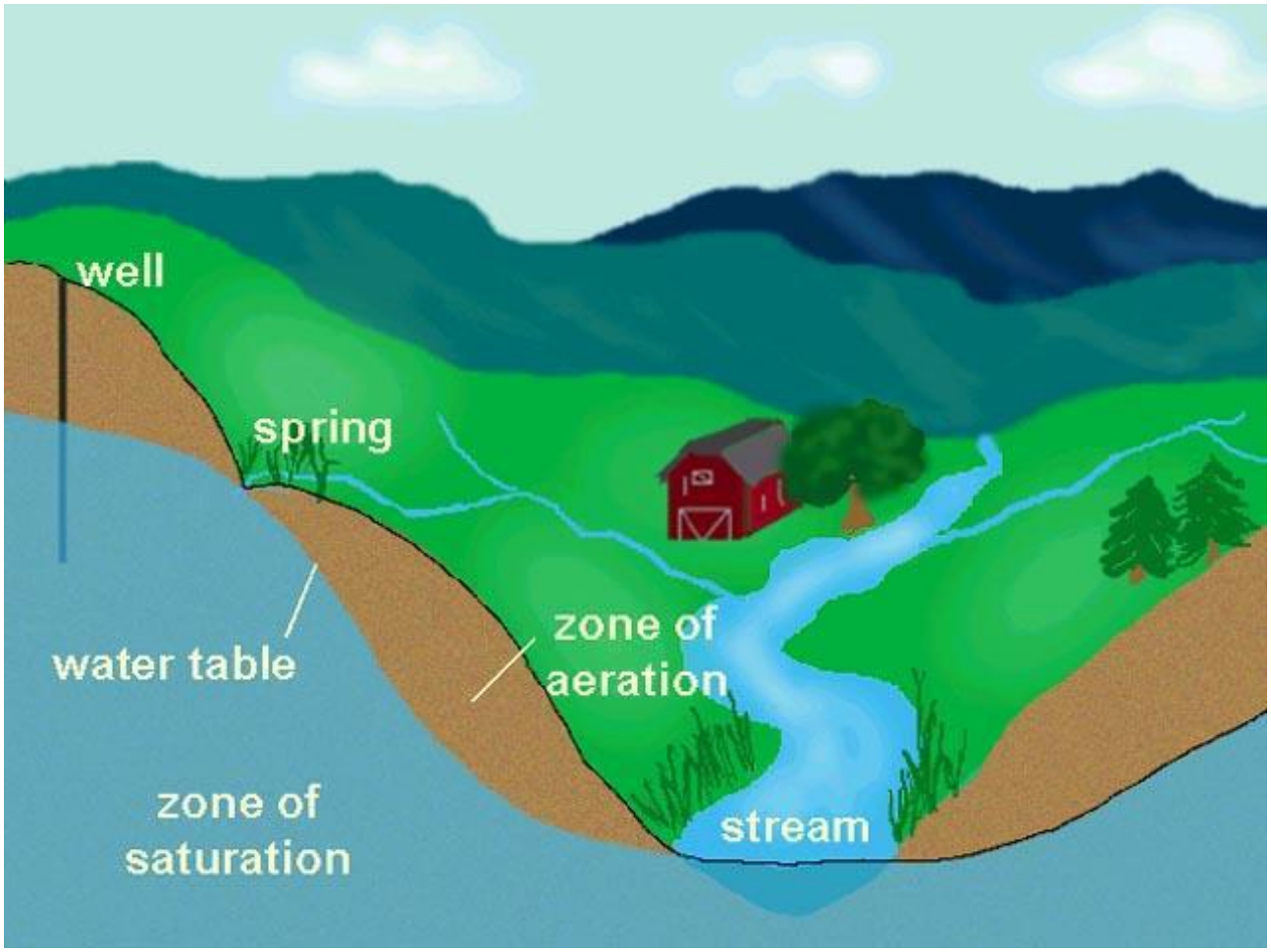
It originates from deep wells and subterranean springs. This is virtually free of bacteria due to filtering action of soil, deep sand and rock. However, it may become contaminated when it flows along the channels.

Surface water

It is found in streams, lakes, and shallow wells. The air through which the rain passes may contaminate the water. Other sources are the various types of establishments and agricultural farms etc by the sides the water flows.
Possible sources of microbial contamination of a body of water are soil and agricultural run off, farm animals, rain water, industrial waste, discharges from sewage treatment plants and storm water run off from urban areas.
"Water microbiology is concerned with the microorganisms that live in water, or can be transported from one habitat to another by water."

Many microorganisms are found naturally in fresh and saltwater. These include bacteria, cyanobacteria, protozoa, algae, and tiny animals such as rotifers. These can be important in the food chain that forms the basis of life in the water. For example, the microbes called cyanobacteria can convert the energy of the sun into the energy it needs to live. The plentiful numbers of these organisms in turn are

used as food for other life. The algae that thrive in water are also an important food source for other forms of life.



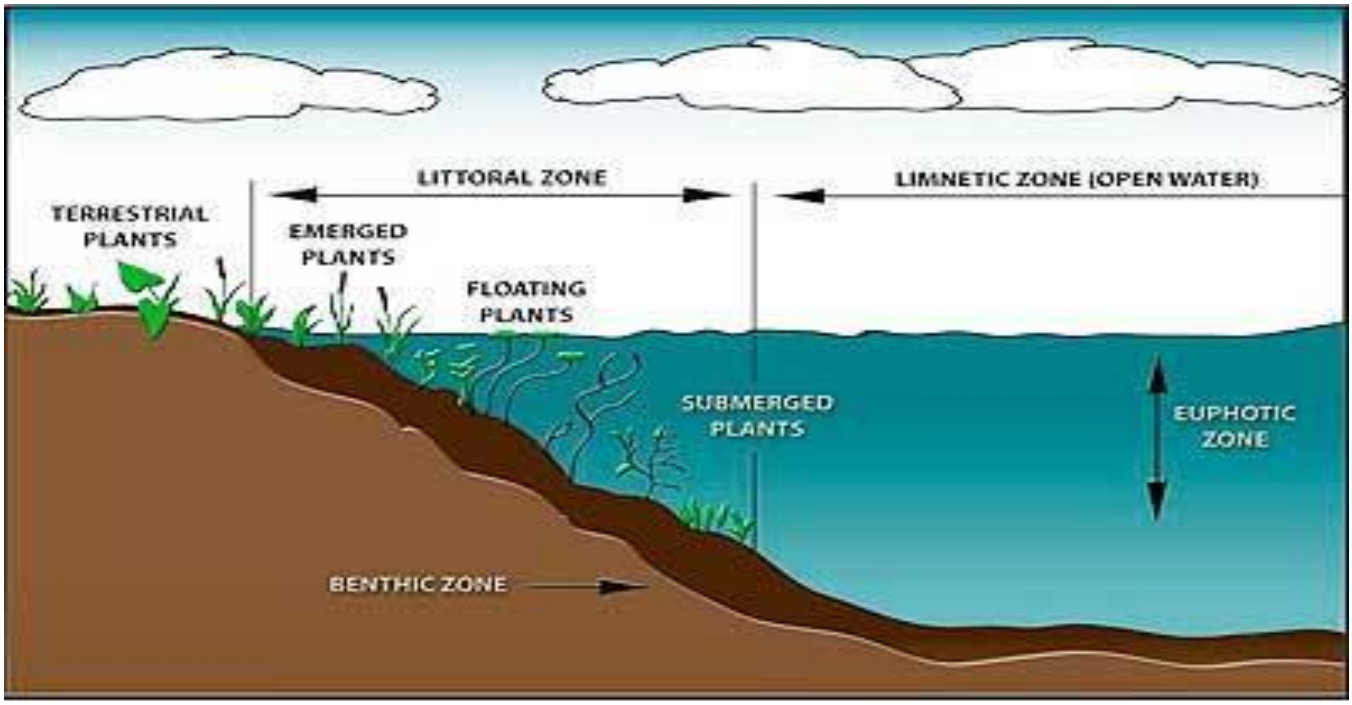
Water can support the growth of many types of microorganisms. This can be advantageous However, the presence of other disease causing microbes in water is unhealthy and even life threatening. For example, the chemical activities of certain strains of yeasts provide us with beer and bread. As well, the growth of some bacteria in contaminated water can help digest the poisons from the water.

. For example, bacteria that live in the intestinal tracts of humans and other warm blooded animals, such as Escherichia coli, Salmonella, Shigella, and Vibrio, can contaminate water if feces enter the water. Contamination of drinking water with a type of Escherichia coli known as O157:H7 can be fatal. The contamination of the municipal water supply of Walkerton, Ontario, Canada in the summer of 2000 by strain O157:H7 sickened 2,000 people and killed seven people.

The intestinal tract of warm-blooded animals also contains viruses that can contaminate water and cause disease. Examples include rotavirus, entero viruses, and coxsackievirus.

Another group of microbes of concern in water microbiology are protozoa. The two protozoa of the most concern are Giardia and Cryptosporidium

Fresh Water Microbiology



The Littoral Zone:

A variety of microorganisms live in fresh water. The region of a water body near the shoreline () is well lighted, shallow, and warmer than other regions of the water. Photosynthetic algae and bacteria that use light as energy thrive in this zone.

The Limnitic Zone:

Further away from the shore is the. Photosynthetic microbes also live here. As the water deepens, temperatures become colder and the oxygen concentration and light in the water decrease. Now, microbes that require oxygen do not thrive. Instead, purple and green sulfur bacteria, which can grow without oxygen, dominate.

The Benthic Zone

Finally, at the bottom of fresh waters (), few microbes survive. Bacteria that can survive in the absence of oxygen and sunlight, such as methane producing bacteria, thrive.

Saltwater Microbiology

Presents a different environment to microorganisms. The higher salt concentration, higher pH, and lower nutrients, relative to freshwater, are lethal to many microorganisms. But, salt loving (halophilic) bacteria abound near the surface, and some bacteria that also live in freshwater are plentiful (i.e., Pseudomonas and Vibrio). Also, in 2001, researchers demonstrated that the ancient form of microbial life known as archaebacteria is one of the dominant forms of life in the ocean. The role of archaebacteria in the ocean food chain is not yet known, but must be of vital importance.

Another microorganism found in saltwater is a type of algae known as dinoflagellelates. The rapid growth and multiplication of dinoflagellates can turn the water red. This "red tide"

depletes the water of nutrients and oxygen, which can cause many fish to die. As well, humans can become ill by eating contaminated fish.
Water can also be an ideal means of transporting microorganisms from one place to another. For example, the water that is carried in the hulls of ships to stabilize the vessels during their ocean voyages is now known to be a means of transporting microorganisms around the globe. One of these organisms, a bacterium called **Vibrio cholerae, causes life threatening diarrhea in humans.**

Methods To Mininmize the Microbial-Contamination

Drinking water is usually treated to minimize the risk of microbial contamination. The importance of drinking water treatment has been known for centuries.
1. For example, in pre-Christian times the storage of drinking water in jugs made of metal was practiced. Now, the anti-bacterial effect of some metals is known.
2. Similarly, the boiling of drinking water, as a means of protection of water has long been known.

3.Chemicals such as chlorine or chlorine derivatives has been a popular means of killing bacteria such as Escherichia coli in water since the early decades of the twentieth century.

4. Other bacteria-killing treatments that are increasingly becoming popular include the use of a gas called ozone.

5. The disabling of the microbe's genetic material by the use of ultraviolet light.

6. Microbes can also be physically excluded form the water by passing the water through a filter. Modern filters have holes in them that are so tiny that even particles as miniscule as viruses can be trapped.

Turbidity-Test

Turbidity-Test

An important aspect of water microbiology, particularly for drinking water, is the testing of the water to ensure that it is safe to drink. Water quality testing can be done in several ways. One popular test measures the turbidity of the water. Turbidity gives an indication of the amount of suspended material in the water. Typically, if material such as soil is present in the water then microorganisms will also be present. The presence of particles even as small as bacteria and viruses can decrease the clarity of the water. Turbidity is a quick way of indicating if water quality is deteriorating, and so if action should be taken to correct the water problem.

In many countries, water microbiology is also the subject of legislation. Regulations specify how often water sources are sampled, how the sampling is done, how the analysis will be performed, what microbes are detected, and the acceptable limits for the target microorganisms in the water sample.

Testing for microbes that cause disease (i.e. Salmonella typhymurium and Vibrio cholerae) can be expensive and, if the bacteria are present in low numbers, they may escape detection. Instead, other more numerous bacteria provide an indication of fecal pollution of the water. Escherichia coli have been used as an indicator of fecal pollution for decades.

The bacterium is present in the intestinal tract in huge numbers, and is more numerous than the disease-causing bacteria and viruses. The chances of detecting Escherichia coli are better than detecting the actual disease causing microorganisms. Escherichia coli also had the advantage of not being capable of growing and reproducing in the water (except in the warm and food-laden waters of tropical countries). Thus, the presence of the bacterium in water is indicative of recent fecal pollution. Finally, Escherichia coli can be detected easily and inexpensively.