

**Bacteria** are free-living cells that can live inside or outside a body, while **viruses** are a non-living collection of molecules that need a host to survive.

A **parasite** is an organism that lives on or in a host organism and gets its food from or at the expense of its host. There are three main classes of parasites that can cause disease in humans: protozoa, helminthes, and ectoparasites. Numerous parasites can be transmitted by food including many protozoa and helminth. The most common foodborne parasites are protozoa.

### **Fungi (Yeast & Molds)**

Fungus, plural fungi, any of about 144,000 known species of organisms of the kingdom Fungi, which includes the yeasts, rusts, smuts, mildews, molds, and mushrooms. Fungi are among the most widely distributed organisms on Earth and are of great environmental and medical importance. Many fungi are free-living in soil or water; others form parasitic or symbiotic relationships with plants or animals.

Yeast are single-celled microorganisms that are classified, along with molds and mushrooms, as members of the Kingdom Fungi.

A mold or mould is a fungus that grows in the form of multicellular filaments called hyphae.

### **Role of Microbes**

Micro-organisms or Microbes are group of living organisms which are microscopic in size. They are invisible to naked eyes ex. viruses, Bacteria, fungi, algae and Protozoa.

They present everywhere like air, water, land/soil, Hot waters on /inside the bodies of Animals and Plants.

Harmful impacts → Pathogenic → disease causing

Food spoilage → they cause a food to smell, taste, and look unacceptable 25% of world's food supply is lost due to spoilage

Useful impacts - for the human Welfare.

- Production of bread, Cheese, yoghurt, antibiotics, vaccines. Vitamins, enzymes and many other useful Products.
- Part of food chain → decomposers (Bacteria and fungi) -
- Required for various cycles of nature - C, N<sub>2</sub>, O<sub>2</sub>. Some micro-organisms do nothing
- They make food safe (microbiologically and chemically)
- They Provide Products of highest quality (flavour, colour and texture)
- High economic Values- (Cheese, Alcohol)
- To make food into forms that are convenient (ease to use).

Micro-organisms have a great impact on many areas of Biology

- Adds variety
- Flavour
- Colour
- Fermentation
- Important component of Food processing industry
- Beer,Wine making

Bacteria, molds and yeast are the most important microorganisms that cause food spoilage and also find the maximum exploitation in production of food and food products.

Different strains of bacteria and fungus are used for fermentation of dairy products for production of a wide variety of cultured milk products. Both bacteria and fungi are used in these cheese production processes.

Lactic acid bacteria are used for coagulation of milk that can be processed to yield a wide variety of cheeses.

Molds are used for rotting of grapes for production of different varieties of wines.

Mushrooms are one of the most important fungi used as a food source.

Alcoholic beverages as beer are produced by fermentation of cereals and grains using different strains of yeasts.