

# CLASS- 7

## Sub- SCIENCE

### CHAPTER 2- MICROORGANISMS: FRIEND AND FOE

#### What are Microbes?

Microbes or microorganisms are tiny organisms which are so small that we cannot see them with an unaided eye. Some microorganisms can be seen with the help of a magnifying glass (such as fungus that grows on bread) while some can only be seen when you use a microscope (such as bacteria and protozoa). Microorganism were first observed by Anton Van Leeuwenhoek.

#### Viral, Bacterial, and Protozoan Diseases

##### Causes Diseases Viruses

##### Common Ailments: Cold, Cough, and Influenza (or Flu)

##### Serious Diseases: Polio, Chicken Pox, Measles etc

##### Bacteria

##### Typhoid and Tuberculosis (TB) etc

##### Protozoans

##### Dysentery and Malaria etc

##### Table 1: Microbial Diseases

## Microorganisms

There are four major types of microorganisms:

### Fig 1: Types of Microorganisms

Bacteria: These are single-celled organisms with a rigid cell wall. They can only be seen under a microscope which enlarges images from 100 to 1000 times.

### Fig 2: Ultrastructure of a Bacterial Cell

Types of Bacteria (based on their Shapes) and their Examples

Shape of Bacteria Example Image Comma-shaped Bacteria

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Fig 3: Vibrio Cholera

Vibrio Cholerae Spherical-shaped Bacteria (Cocci)

**Fig 3: Streptococcus**

**Staphylococcus and Streptococcus Rod-shaped Bacteria (Bacilli)**

**Fig 4: Salmonella**

**E.coli and Salmonella Spiral-shaped Bacteria (Spirilla)**

**Fig 5: Borrelia**

**Treponema and Borrelia**

**Table 2: Shapes of Bacteria (with Examples)**

**Fungi: These are non-green plants and hence, cannot make their own food. They either live as parasites (deriving nutrition from host organisms, for example, Puccinia which causes wheat leaf rust) or grow on the organic matter (such as bread mould).**

**Fig 7: Puccinia triticina**

**Fig 8: Bread Mould**

Fungi, like mushrooms, moulds, mildews, and yeasts, are eukaryotic. It means that they have a true nucleus.

The main components of fungi are:

i. Hyphae: They are thread-like filaments which penetrate into substrates, secrete enzymes to break down nutrients into smaller molecules, and absorb them.

ii. Spores are a unit of sexual or asexual reproduction. They can adapt for dispersal and survival for extended periods of time in unfavourable conditions.

Algae : These are simple plant- like organisms which are usually aquatic in nature. They contain a cell wall and chlorophyll and can make their own food by photosynthesis. Algae can be unicellular or multicellular. Some of the common examples are diatoms, Chlamydomonas, and seaweed.

Protozoa: Protozoa are unicellular organisms. Some of them live independently while others live as parasites. Many of the parasitic protozoans cause diseases in plants, domestic animals, and human beings. Example of some protozoans are Amoeba, Plasmodium and Paramecium

Fig 9: Paramecium

## How are Viruses different from other microbes?

Viruses are microscopic organisms but they are different from other microbes because they reproduce only inside the cells of the host organism (which can be a plant, animal, or a bacterium).

## Fig 10: Types of Viruses

Viruses are much smaller than bacteria and come in a wide variety of shapes and sizes. A complete virus particle is known as Virion.

Virion consists of a nucleic acid surrounded by 'capsid'. Capsid is a protective coat made of protein. The subunits of this protein called 'Capsomeres'. Viruses can be seen only by an electron microscope as they are ultramicroscopic in size.

Outside the body of a living organism, they do not show any reaction and hence, can be crystallized and stored like non-living things.

## Where do Microorganisms Live?

Microbes can survive in all kinds of environments – from icy cold climates to hot springs (any kind of temperature); and deserts to marshy lands (any humidity level). Some live independently while others live as parasites – inside the bodies of other organisms (including animals and human beings).

## Microorganisms and Us

Some microorganisms are beneficial to us while others are harmful and cause diseases.

How are bacteria useful to us?

Bacteria are helpful because:

It decomposes organic wastes (such as vegetable peels, animal remains, and faeces etc.).

It is used in the preparation of medicines.

It increases soil fertility by fixing nitrogen.

It is used in the setting of curd and making cheese, pickles, and other food items.

How is yeast useful to us?

Yeast is used in the baking industry (to make bread, pastries, and cakes) because it helps in fermentation. It reproduces rapidly and

produces carbon dioxide during respiration. Bubbles of the carbon-dioxide gas it produces fill the spaces in the dough and increases its volume.

It is also used in the commercial production of alcohol and wine which is done by growing yeast on natural sugars present in fruit juices and grains like rice, wheat, and barley.

## Antibiotics

What are Antibiotics? What are their uses?

Antibiotics are medicines that can kill or stop the growth of disease-causing microorganisms. For Example, Penicillin.

Antibiotics are used to:

Cure a variety of diseases (such as streptomycin, erythromycin, and tetracycline that are made from bacteria and fungi),

Cure microbial infection in animals (by mixing antibiotics with the feed of livestock and poultry), and

Control several plant diseases.

**What precautions should be followed while taking antibiotics and why?**

**Antibiotics should be taken only on the advice of the doctor, and one must complete the course the doctor prescribes.**

**Antibiotics taken in wrong doses may make the body resistant to the drug and it may not be effective in the future. Moreover, antibiotics may also kill the beneficial bacteria in the body.**

**Please Note: Antibiotics cannot cure cold and flu caused by viruses.**

**Some Definitions to Remember:**

**Pathogens: Disease-causing microbes are called Pathogens.**

**Antibodies: Antibodies are substances our body produces to fight disease-causing microbes.**

**Vaccines: Vaccines are weakened or dead disease-causing microbes that are injected in our body to trigger the production of antibodies. These antibodies remain in the body for a long time to protect it against any attack of disease-causing microbes.**

**Vaccination: The process of protecting the body from pathogens with the help of vaccines is called Vaccination.**

**Now Answer these questions:-**

**Q.1) What are microorganisms? Give Examples**

**Q.2) Define virus. Why are viruses different from other organisms?**

**Q.3)How do Microorganisms help in Agriculture?**

**Q.4)What do you mean by vaccination?**

**Q.5) Write some Uses of Microorganisms in our daily life.**