

KENDRIYA VIDYALAYA SHAHDARA

CLASS VIII

SUBJECT- SCIENCE

CHAPTER -2

MICROORGANISMS: FRIEND AND FOE

PREPARED BY:

SHASHI BALA

TGT (SCIENCE)

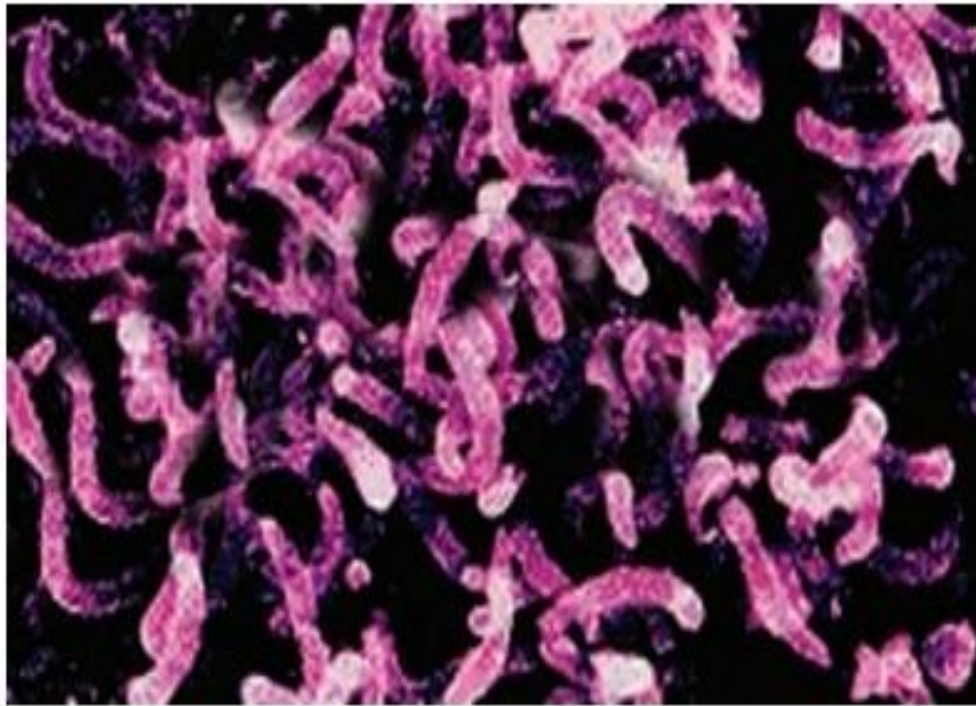
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Introduction

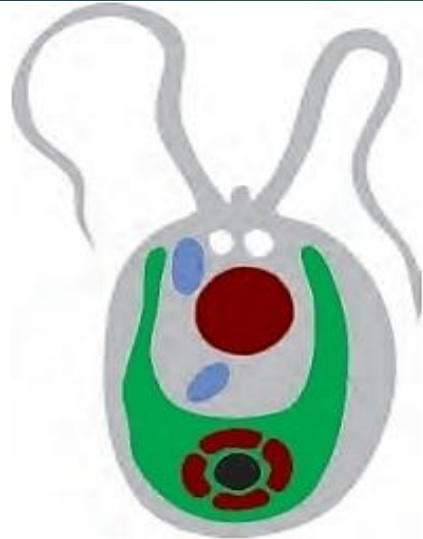
- ▶ Organisms that are so small that they can only be seen through a microscope are called microorganisms or microbes.
- ▶ The study of microorganisms is known as microbiology.
- ▶ Most organisms are hardy and can be found in almost any kind of environment – hot desert, polar ice caps, salt water, marsh lands and inside other organisms.

Types of microorganisms

- ▶ There are five major groups of microorganism. These are as follows:
- ▶ Bacteria
- ▶ Algae
- ▶ Protozoa
- ▶ Fungi
- ▶ Viruses



Bacteria



Chlamydomonas

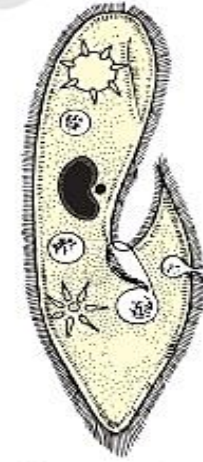


Spirogyra

Algae

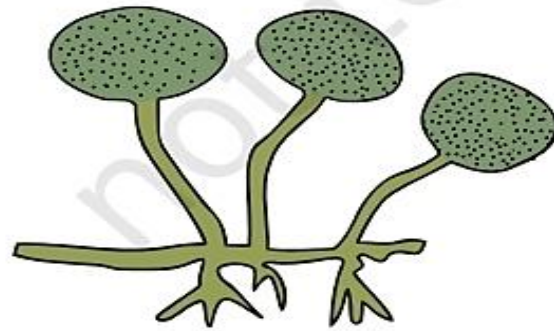


Amoeba

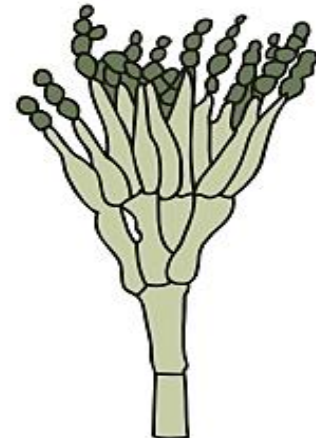


Paramecium

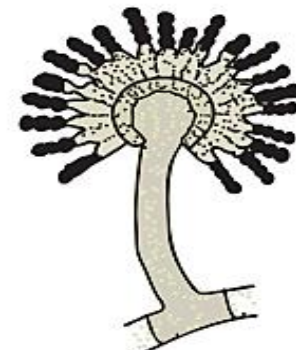
Protozoa



Bread mould



Penicillium



Aspergillus

Fungi

Bacteria:

They are simple living organisms which are found all around us. They are mostly single-celled tiny organisms, but they live together in colonies of millions.

Bacteria are found in three different shapes:

1. Rod shaped, called bacilli.
2. Spherical shaped, called cocci.
3. Spiral called spirilla.

Algae

- ▶ Algae 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

- ▶ These are unicellular microscopic organisms similar to animals that can move about to capture food and are heterotrophic in nature.
- ▶ They are mostly aquatic in nature.
- ▶ Amoeba, paramecium are some examples of protozoa.

Fungi

- ▶ Plant -like organisms that do not contain chlorophyll are called Fungi.
- ▶ Fungi may be unicellular (Yeast) or multicellular (Bread mould) and are found in warm and moist places.
- ▶ Fungi can be heterotrophic, saprophytic or parasitic in nutrition.
- ▶ Examples: Yeast, Rhizopus (Bread mould), mushrooms, puffballs.

Virus

- ▶ Viruses are smaller than any known cell.
- ▶ Viruses can only be seen with electron microscope.
- ▶ Viruses can reproduce only inside the bodies of other organisms, which mean they need a host.
- ▶ A virus is like a non- living thing outside the body of other organisms. Therefore, it is a borderline between a living and a non- living thing.

USEFUL MICROORGANISMS

Microorganisms are useful in the following ways:

- ▶ In food and beverage industry
- ▶ In making medicines and vaccines
- ▶ In agriculture
- ▶ In cleaning the environment

Food and beverage industry

- ▶ Bacteria help us in making certain foods. Lactobacillus is a bacterium that sours milk and is used to make curd from milk.
- ▶ Many fungi like Mushrooms and morels are edible which are rich
- ▶ Yeast is commonly employed in preparing food items like bread, cakes, idli, dosa, dhokla etc.
- ▶ Yeast is also used in breweries for making wines by the process of fermentation

Making medicines and vaccines

- ▶ Bacteria and fungi are used to make medicines called antibiotics.
- ▶ The first antibiotic, penicillin was discovered by Alexander Flemming using the fungus penicillium.
- ▶ Some common antibiotics are streptomycin and terramycin.
- ▶ Microbes are used to make vaccines. Vaccines are weakened or dead germs introduced into the body. They offer protection against diseases like tuberculosis, polio etc. by producing anti- bodies.
- ▶ Bacteria and Yeast are used in making vitamin B complex tablets.
- ▶ The human hormonal called insulin can also be obtained from bacteria.

In Agriculture

Some bacteria like Rhizobium, blue green algae like Nostoc, live in the root nodules of plants such as gram, pea etc. These bacteria absorb the nitrogen of the atmosphere and convert it into nitrate which serves as natural fertilizers for plants, hence, enhancing soil fertility

In cleaning the environment

- ▶ Microbes help to keep our environment clean by decomposing dead matter. They decomposed substances are recycled as these get reused from the soil by plants.
- ▶ Some bacteria decompose sewage and other waste in water. This is nature's method of keeping the environment free from pollution.

HARMFUL MICROORGANISMS

- ▶ Microorganisms that cause diseases in human, animals and plants are called pathogens or germs.
- ▶ Germs may enter the body of living organisms through air, contaminated food and water, from an infected person by direct or indirect contact or by a carrier.
- ▶ Diseases that can spread from an infected person to a healthy individual through air, water or direct contact are called communicable diseases. Examples: Common cold, chicken pox, AIDS etc.
- ▶ Micro organisms also cause diseases in animals and plants. For examples-
- ▶ Anthrax is a disease caused by bacterium and affects human and cattle.
- ▶ A virus causes the dangerous **foot and mouth disease** in cattle.
- ▶ **Citrus canker** is a bacterial disease that affects trees of citrus fruits and is spread by air.
- ▶ **Rust of wheat** is a viral disease that affects vegetable like bhindi & spread by insects.
- ▶ **Malaria** is actually caused by pathogen called plasmodium (protozoa) which is transmitted by female Anopheles mosquito.
- ▶ **Dengue** is caused by dengue virus and spread by female Aedes mosquito.

Some Common Plant Diseases caused by Microorganisms

Plant Diseases	Micro-organism	Mode of Transmission
Citrus canker	Bacteria	Air
Rust of wheat	Fungi	Air, seeds
Yellow vein mosaic of <i>bhindi</i> (Okra)	Virus	Insect

Some Common Human Diseases caused by Microorganisms

Human Disease	Causative Microorganism	Mode of Transmission	Preventive Measures (General)
Tuberculosis	Bacteria	Air	Keep the patient in complete isolation. Keep the personal belongings of the patient away from those of the others. Vaccination to be given at suitable age.
Measles	Virus	Air	
Chicken Pox	Virus	Air/Contact	
Polio	Virus	Air/Water	
Cholera	Bacteria	Water/Food	Maintain personal hygiene and good sanitary habits. Consume properly cooked food and boiled drinking water. Vaccination.
Typhoid	Bacteria	Water	
Hepatitis A	Virus	Water	Drink boiled drinking water. Vaccination.
Malaria	Protozoa	Mosquito	Use mosquito net and repellents. Spray insecticides and control breeding of mosquitoes by not allowing water to collect in the surroundings.

Preventing the spread of Communicable diseases

- ▶ Some simple methods of limiting the spread of communicable diseases are:
- ▶ To keep the infected person separated from others & to advise his/her to keep a handkerchief on the nose and mouth while sneezing.
- ▶ To keep our environment or surrounding clean.
- ▶ Never let garbage collect in the neighborhood.
- ▶ Timely vaccination against diseases should also be taken.
- ▶ To prevent mosquitoes from breeding we should not allow water to collect anywhere in our neighborhoods.

Food spoilage:

- ▶ Many bacteria and fungi grow on food items and produce certain toxic substances. This makes the food unfit for consumption. Consuming such food can cause a serious illness called food poisoning.

Food preservation

- ▶ Processing of food to prevent their spoilage and to retain their nutritive value for period is called food preservation.
- ▶ Food can be preserved using many methods:-
 - ▶ **Heating:** heating food to a high temperature kills microbes. For example: Milk and water are boiled to kill microbes.
 - ▶ **Cooling:** food can be kept in refrigerator at about 5°C which delays its spoilage.
 - ▶ **Canning:** canning is done to package or preserve food or drink by putting it in sealed, airtight containers.
 - ▶ **Salting:** Fruit and vegetables can be preserved by using salt and then drying. Salts prevent the growth of microbes.
 - ▶ **Sweetening:** Excess sugar can also works on the same principle as salting. Jams, jellies & squashes are preserved by this method.
 - ▶ **Dry or dehydration:** Dehydration of food remaining water from it. This stops microorganisms from growing as they cannot grow without water.
- ▶ **Chemical preservatives:** Chemicals like sodium benzoate and sodium metabisulphite prevent microbial attack and are often use to preserve jams, sauces & ketchup.

NITROGEN CYCLE



Fig. 2.9 : Roots of a leguminous plant with root nodules

2.7 Nitrogen cycle

Our atmosphere has 78% nitrogen gas. Nitrogen is one of the essential constituents of all living organisms as part of proteins, chlorophyll, nucleic acids and vitamins. The atmospheric

nitrogen cannot be taken directly by plants and animals. Certain bacteria and blue green algae present in the soil fix nitrogen from the atmosphere and convert it into compounds of nitrogen. Once nitrogen is converted into these usable compounds, it can be utilised by plants from the soil through their root system. Nitrogen is then used for the synthesis of plant proteins and other compounds. Animals feeding on plants get these proteins and other nitrogen compounds (Fig. 2.10).

When plants and animals die, bacteria and fungi present in the soil convert the nitrogenous wastes into nitrogenous compounds to be used by plants again. Certain other bacteria convert some part of them to nitrogen gas which goes back into the atmosphere. As a result, the percentage of nitrogen in the atmosphere remains more or less constant.

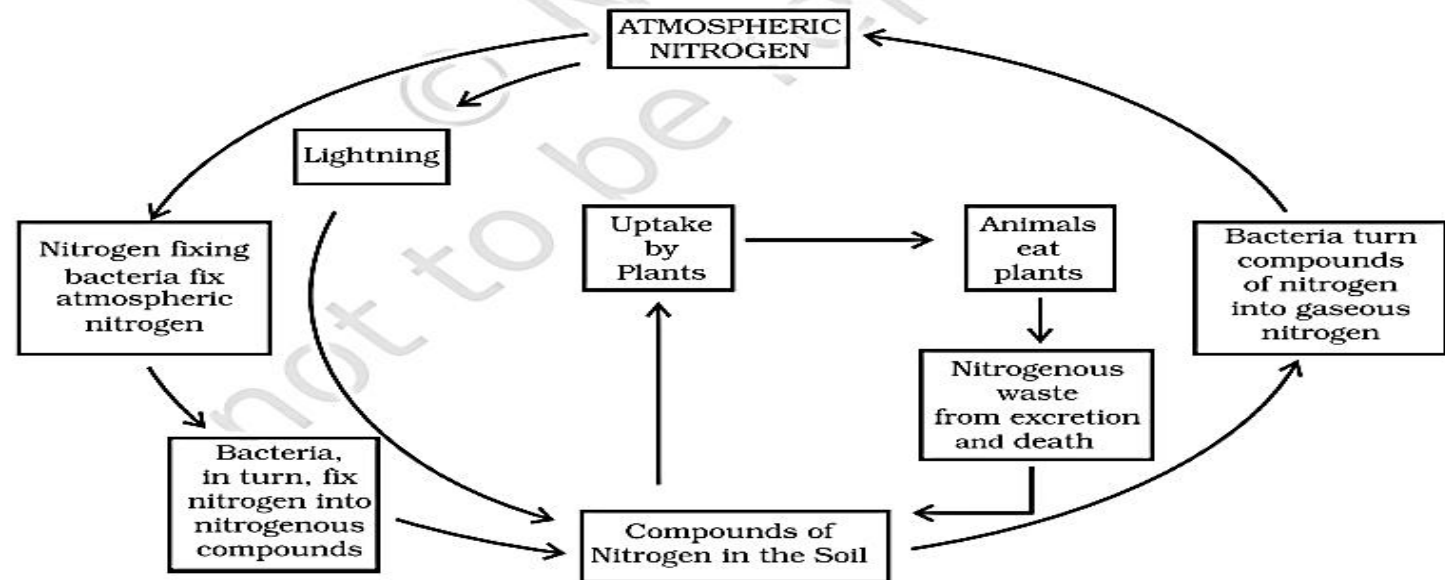


Fig. 2.10 : Nitrogen cycle

THANK YOU