

CHAPTER – 2

MICROORGANISMS: FRIEND AND FOE

EXERCISES

1 Mark Questions

Q1: Name the microorganisms which can fix atmospheric nitrogen in the soil.

Answer: Rhizobium, Clostridium and Azotobacter.

Q2: Which microorganism is the cause of malaria?

Answer: A Protozoan, Plasmodium.

Q3: Can microorganisms be seen with the naked eye? If not, how can they be seen?

Answer: No, microorganisms cannot be seen with the naked eye. They can only be seen with the help of microscope.

Q4: What are microorganisms?

Answer: Microorganisms are organisms that are so small that they can only be seen through a microscope.

Q5: Define fermentation.

Answer: The process of conversion of sugar into alcohol is called fermentation.

Q6: Why antibiotics are not effective against cold and flu?

Answer: Cold and flu are caused by viruses, so the antibiotics are not effective against them.

Q7: What are preservatives?

Answer: Chemicals (salts, etc.) that check the growth of microorganisms are called preservatives.

Q8: Name the causative microorganism of tuberculosis and its mode of transmission.

Answer: Causative microorganisms – Bacteria.
Mode of transmission – Air.

Q9: What are communicable diseases?

Answer: Microbial diseases which can spread from an infected person to a healthy person through air, water, food or physical contact are known as communicable diseases.

Q10: Name one plant disease caused by fungi and its mode of transmission.

Answer: Rust of wheat. It is transmitted through air and seeds.

2 Mark Questions

Q1: Can microorganisms be seen with the naked eye? If not, how can they be seen?

Answer:

The microorganisms cannot be seen with our naked eyes because they are very small in size. Some of these, such as fungus growing on bread, can be seen with a magnifying glass. Others cannot be seen without the help of a microscope.

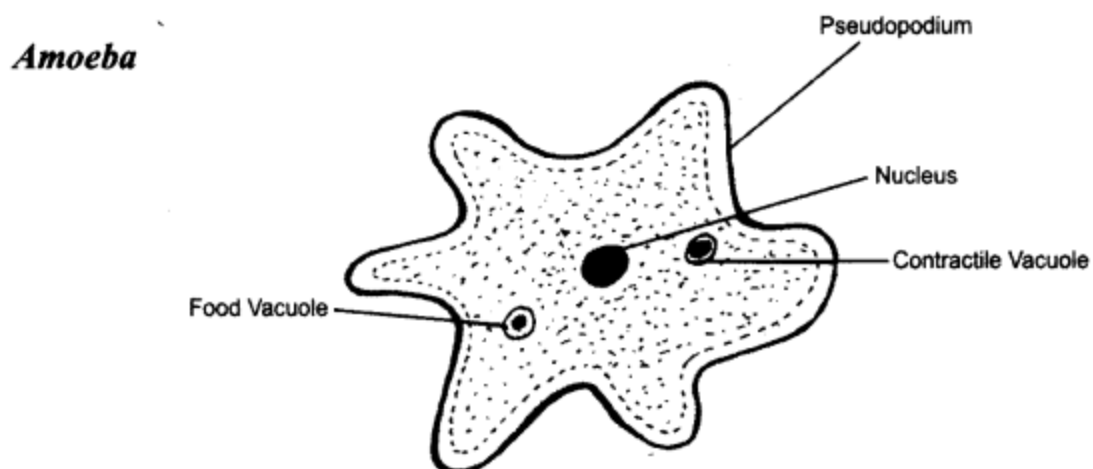
Q2: What are the major groups of microorganisms?

Answer: Microorganisms are classified on the basis of their size into four major groups. These groups are:

- (a) Bacteria
- (b) Fungi
- (c) Protozoa
- (d) Some algae

Q3: Draw a labeled diagram of Amoeba.

Answer:



Q4: What are antibiotics? What precautions must be taken while taking antibiotics?

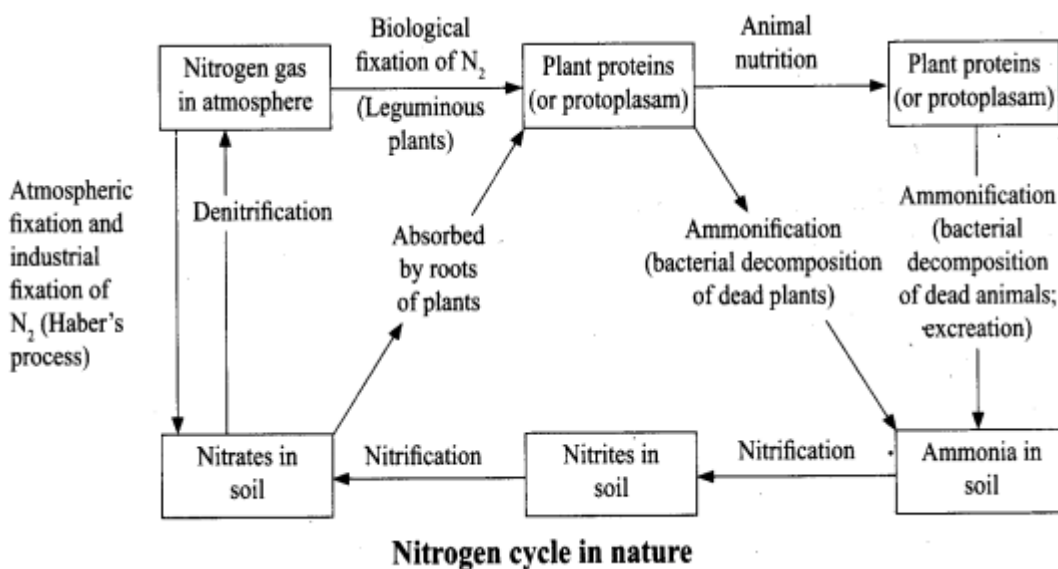
Answer:

Antibiotics are the medicines which kill or stop the growth of the disease-causing microbes. They are manufactured by growing specific microorganisms. They are used to cure a variety of diseases.

It is important to take antibiotic only on the advice of a qualified doctor. One must finish the course prescribed by the doctor to make the drug more effective. Antibiotics must not be taken unnecessarily because it may kill beneficial bacteria also. Antibiotics are, however, not effective against cold and flu as they are caused by viruses.

Q5: Describe the nitrogen cycle with the help of a neat and labelled diagram

Answer:



5 Mark Questions

Q1: Write 10 lines on the usefulness of microorganisms in our lives.

Answer:

Microorganisms are useful to us in many ways. For example,

- Bacteria like *Lactobacillus* convert milk into curd.
- Bacteria are also involved in the making of cheese.
- *Acetobacter aceti* is used for producing acetic acid from alcohol.
- Yeast is used in the commercial production of alcohol, wine and bakery products.
- Some specific microorganisms are helpful in manufacturing of antibiotics.
- Microorganisms act as cleansing agents and decompose the waste products into manure.
- Dead or weakened microbes are used in the preparation of vaccines.
- Some bacteria fix atmospheric nitrogen and increase soil fertility.
- Algae, yeast, fungi or bacteria may be used as an ingredient or a substitute for protein-rich foods that are suitable for human or animal consumption.
- Some microorganisms are taken as probiotics that are believed to provide health benefits when consumed.

Q2: Write a short paragraph on the harms caused by microorganisms.

Answer:

Microorganisms are harmful to us in many ways. For example, microorganisms, called pathogens cause disease in humans, plants and animals. Pathogens or germs enter a healthy body through air, water, contaminated food and infected person by direct or indirect contact or by the carrier. Common ailments like cold, influenza (flu), cough, polio, chicken pox are caused by viruses. Foot and mouth diseases in the cattle are also caused by viruses. Typhoid, tuberculosis (TB) are caused by bacteria. Anthrax a dangerous human and cattle diseases is also caused by bacteria.

Diseases like dysentery and malaria are caused by protozoa. Ringworm is caused by fungi. Several microbes cause diseases in plants and thus reduces the yield. Citrus canker, a bacterial disease, affects trees of citrus fruit and is spread by air. Bhendi yellow vein mosaic disease is caused by a virus and is spread by insects in

lady fingers. Rust of wheat is a fungal disease spread through air. Microorganisms that grow on our food sometimes produce toxic substances. These make the food poisonous causing serious illness and even death. This food-borne illness is called food poisoning.

Q3: What are antibiotics? What precautions must be taken while taking antibiotics?

Answer:

Antibiotics are medicines produced by certain microorganisms which kill or stop the growth of microorganisms in our body. These are very effective in preventing the effects of microorganisms. Antibiotics are made from bacteria and fungi. Antibiotics treat various human and animal diseases as they target bacteria and viruses. They have significantly enhanced our ability to treat severe diseases like plague, whooping cough, and leprosy. Examples of general antibiotics are streptomycin, tetracycline, erythromycin etc.

Precautions to be taken while taking antibiotics:

- Antibiotics should only be taken under the guidance of a skilled physician.
- Antibiotics must only be taken when needed and in an adequate amount. Otherwise, they may be harmful and will become less effective in future.
- The antibiotic course should be finished according to the doctor's instructions.
- Antibiotics must be administered in the correct dosage and at the appropriate time.
- Antibiotics that are given in the wrong dose become useless.
- Excessive medication usage might also harm the beneficial bacteria in our bodies

Q4: What are the major groups of microorganisms?

Answer:

Microorganisms are very minute organisms that are invisible to the human eye. Microorganisms are so minute that they can only be seen under the microscope. Microorganisms include bacteria, fungi, Achaea or protests. Microorganisms differ in size and structure, habitat, metabolism, and many other characteristics. Most

bacteria are harmless or helpful, but some are pathogens, causing disease in humans and other animals.

There are five major groups of microorganisms. They are enlisted as

- Bacteria:

It is a single-celled organism.

They can be spiral, rod-shaped, spherical-shaped, or comma-shaped.

It causes diseases like cholera, tetanus and tuberculosis.

- Fungi:

Fungi are usually multicellular organisms that cause several diseases.

Symptoms depend on the area affected

The moulds formed on bread are a specific type of fungi.

- Protozoa:

Protozoa can either be multicellular or unicellular.

Amoeba and Plasmodium are a few examples of protozoa.

They can be harmful to humans as well as different other organisms.

- Virus:

Viruses are disease-causing microorganisms that can only divide inside a host organism/cell.

They remain inactive outside the cell.

It can affect plants, animals as well as humans.

HIV in humans and TMV virus occurring in plants are some examples of viruses.

- Algae:

These are the only microorganisms that are multicellular.

Algae have photosynthetic pigments.

They are also known as precursors of plants.

Spirogyra and Chlamydomonas are some examples of algae.

Q5: Explain Common Human Diseases caused by Microorganisms

Answer:

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.

Fill in the blanks

1. Microorganisms can be seen with the help of a _____

Answer: microscope

2. Blue-green algae fix _____ directly from the air to enhance the fertility of soil.

Answer: nitrogen

3. Alcohol is produced with the help of _____

Answer: yeast

4. Cholera is caused by _____

Answer: bacteria

5. Bacteria, fungi, protozoa and _____ are the major four groups in which microorganisms are classified.

Answer: algae

6. Two microorganisms which live in symbiotic association in lichens are _____ and _____.

Answer: algae, fungus

7. Protozoa are _____ in nature.

Answer: heterotrophic

8. The process of formation of curd from milk is known as the _____ of milk.

Answer: curdling

9. The first antibiotic discovered was _____.

Answer: penicillin

Multiple Choice Questions

1: Yeast is used in the production of

- (a) Sugar
- (b) alcohol
- (c) hydrochloric acid
- (d) oxygen

Answer: (b) alcohol

2: The following is an antibiotic:

- (a) Sodium bicarbonate
- (b) streptomycin
- (c) alcohol
- (d) yeast

Answer: (b) streptomycin

3: Carrier of malaria-causing protozoan is:

- (a) Female Anopheles mosquito
- (b) cockroach
- (c) housefly
- (d) butterfly

Answer: (a) Female Anopheles mosquito

4: The most common carriers of communicable diseases is

- (a) ant
- (b) housefly
- (c) dragonfly
- (d) spider

Answer: (b) housefly

5: The bread or idli dough rises because of:

- (a) heat
- (b) grinding
- (c) growth of yeast cells
- (d) kneading

Answer: (c) growth of yeast cells

6: The process of conversion of sugar into alcohol is called

- (a) Nitrogen fixation
- (b) moulding
- (c) fermentation
- (d) infection

Answer: (c) fermentation

Matching

Match the organisms in Column A with their action in Column B

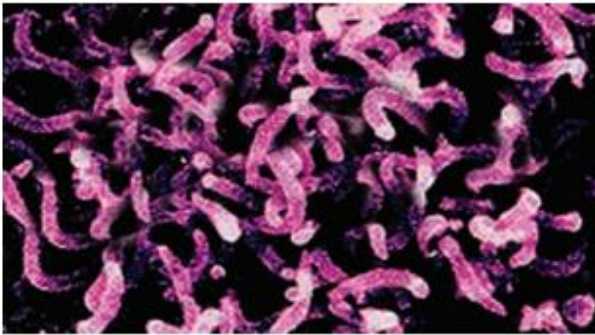
A	B
(i) Bacteria	(a) Fixing nitrogen
(ii) Rhizobium	(b) Setting of curd
(iii) Lactobacillus	(c) Baking of bread
(iv) Yeast	(d) Causing malaria
(v) A protozoan	(e) Causing cholera
(vi) A virus	(f) Causing AIDS
	(g) Producing antibodies

Answer:

A	B
(i) Bacteria	(e) Causing cholera
(ii) Rhizobium	(a) Fixing nitrogen
(iii) Lactobacillus	(b) Setting of curd
(iv) Yeast	(c) Baking of bread
(v) A protozoan	(d) Causing malaria
(vi) A virus	(f) Causing AIDS

DIAGRAMS:

Bacteria:

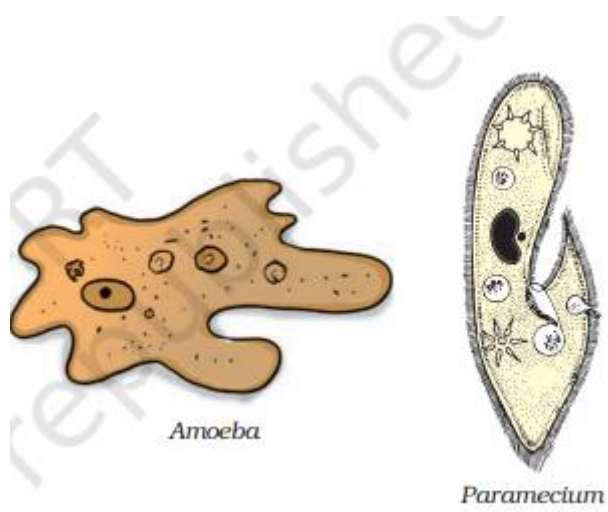


Algae:

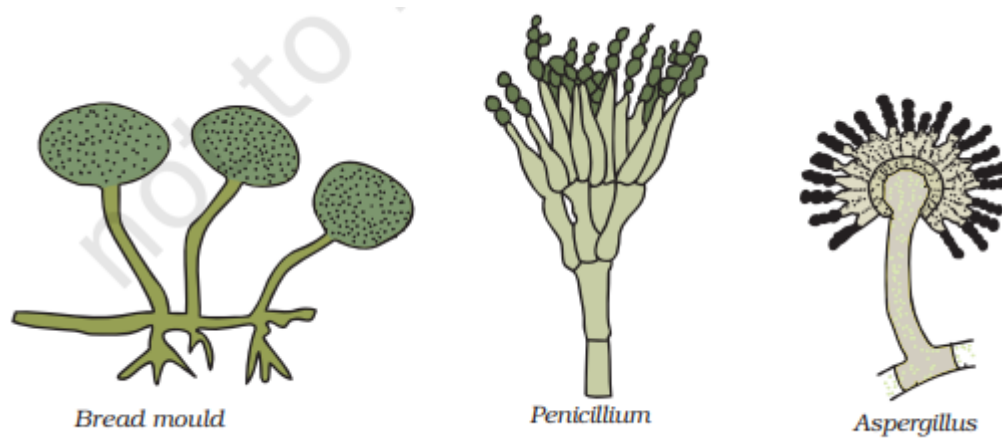


Spirogyra

Protozo



Fungi:



SUMMARY

There are many organisms that live around us that we cannot see with our naked eye. Some of them, like the fungus on bread, can be seen with a magnifying glass. Some can only be seen under a microscope because they are so minute.

Microorganisms, often known as microbes, are organisms that are invisible to the naked eye.

Microorganisms are broadly classified as follows:

- Bacteria are a type of prokaryotic organism (they lack a membrane-bound nucleus and organelles) that make up the majority of microorganisms. They live in soil, water, and any other habitat on Earth. They can be a few micrometres long and come in a variety of shapes, such as spheres, rods, or spirals. Examples: *Escherichia coli*, *coli form bacteria*, and so on.
- Fungi are eukaryotic organisms (they have a membrane-bound nucleus and organelles) that are typically heterotrophic in nature. Examples: *Penicillium*, bread mould, mushroom, etc.
- Protozoa are a class of unicellular eukaryotic organisms that can be parasitic or can live independently and are heterotrophic (cannot prepare their own food). Examples: *Amoeba* and *paramecium*.
- Algae are a type of photosynthetic eukaryotic organism that is mostly found in water. Examples: *Spirogyra*, *Chlamydomonas*, and other bacteria.

In nature, these microorganisms can be either harmful or beneficial.

The virus is a microorganism like the others in this class, but it is unique in that it can only reproduce in the body of a host, whether that is an animal, a plant, or a person. AIDS, herpes, rubella, zika, and other diseases are examples of a virus.

Microorganisms can be single-celled or unicellular, as in bacteria and protozoa, or multicellular, as in fungi and animals. They live in water, air, and a variety of environmental conditions ranging from extreme cold to hot springs, deserts, and marshy lands. Some even live inside the bodies of animals and humans. Some develop on their own, while others thrive on the bodies of other animals.

- Microorganisms include bacteria, fungi, protozoa and some algae. Viruses, though different from the above mentioned living organisms, are considered microbes

- Diseases that can spread from an infected person to a healthy individual through air, water or direct contact are called communicable diseases.
- Bacteria like Rhizobium, blue green algae like Nostoc, live in the root nodules of plants such as gram; pea etc. and they absorb the nitrogen of the atmosphere and convert it into nitrate which serves as natural fertilizers for plants, hence, enhancing soil fertility.
- Protozoa are unicellular microscopic organisms similar to animals that can move about to capture food and are heterotrophic in nature
- Yeast is commonly employed in preparing food items like bread, cakes, idli, dosa, dhokla etc.