

# Chapter 14. Bacteria and Fungi Their Importance

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## Solution 1:

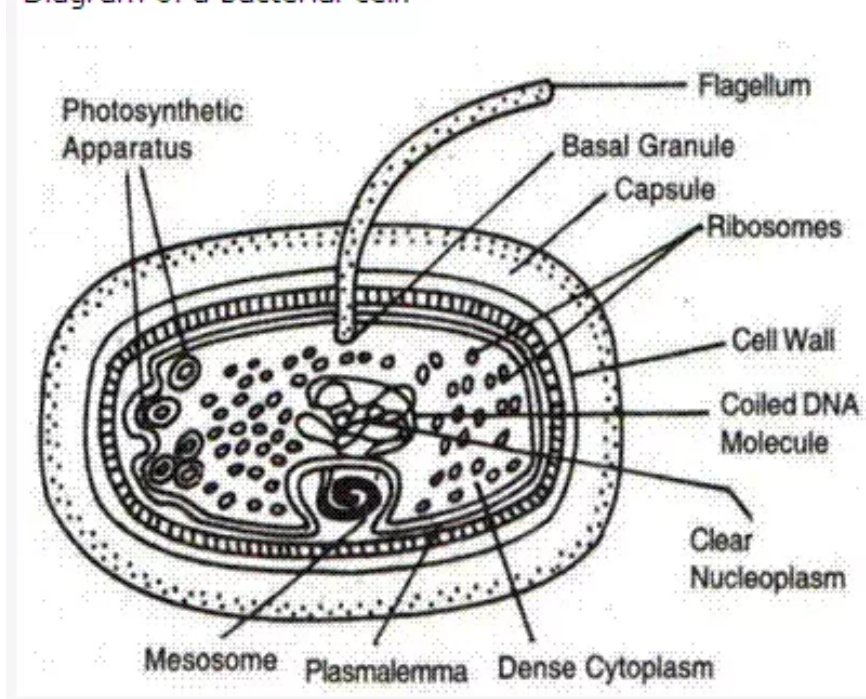
1. Bacteria are a large group of unicellular, prokaryotic microorganisms.
2. The bacteria which do not get stained with crystal violet and iodine solution are called gram negative bacteria while those bacteria which get stained with crystal violet and iodine solution are called gram positive bacteria.

## Solution 2:

1. Bacteria shows the presence of cell wall, hence they are included under plants.
2. Spore formation helps bacteria to survive during adverse environmental conditions. Hence it is a survival technique.
3. **Bacteria as friends :**  
Bacteria are useful to us in many ways like producing antibiotics, forming curd and cheese, tanning leather, producing various industrial products, nitrogen fixation, digesting cellulose etc.  
Bacteria as foes:  
They are harmful in many ways like causing diseases, bio-weapons , food spoilage etc.
4. Yeast is used in breweries since the fermentation activity of yeast produces different types of beverages like wine, beer, alcohol toddy etc. In bakeries, when yeast is added to the flour its fermentation results in the production of carbon dioxide which produces soft bread and other bakery products.

## Solution 3:

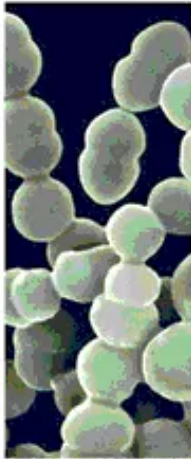
Diagram of a bacterial cell:



#### Solution 4:

(a) Shape of bacteria – Bacteria show wide variation in their shape, but all cells of a species have the same shape. On the basis of shape, bacteria are of following types:

- (i) Coccus bacteria → Spherical shaped
- (ii) Bacillus bacteria → Rod-shaped
- (iii) Spiral bacteria → Helical shaped
- (iv) Vibrio bacteria → Comma shaped.



Spherical (cocci)



Rod-shaped (bacilli)



Spiral



Comma shaped

- (b) Flagellation in bacteria – Many bacteria are motile and contain one or more flagella. The flagella are made up of flagellin protein and rotate like a propeller of ship to bring about movement of bacteria.
- (c) Economic importance of yeast –
- (i) Brewery – The brewing industry depends on the fermentation activity of yeasts. Yeast fermentation produces different types of beverages like wine, beer, alcohol, toddy etc.
  - (ii) Baking – In bakeries during bread making, when yeast is added to the flour its fermentation results in the production of carbon dioxide which produces soft bread.
  - (iii) Vitamins – Yeast is an important source of vitamin B-complex.
  - (iv) Food – Yeast is also used in the preparation of idli and dosa from a mixture of powdered rice and dal.
- (d) Structure of Rhizopus – Rhizopus consists of a multicellular body called mycelium, consisting of filaments called hyphae. Their cell walls are composed of chitin and they have multinucleate cells. They have rhizoids and their sporangiophores are usually unbranched.

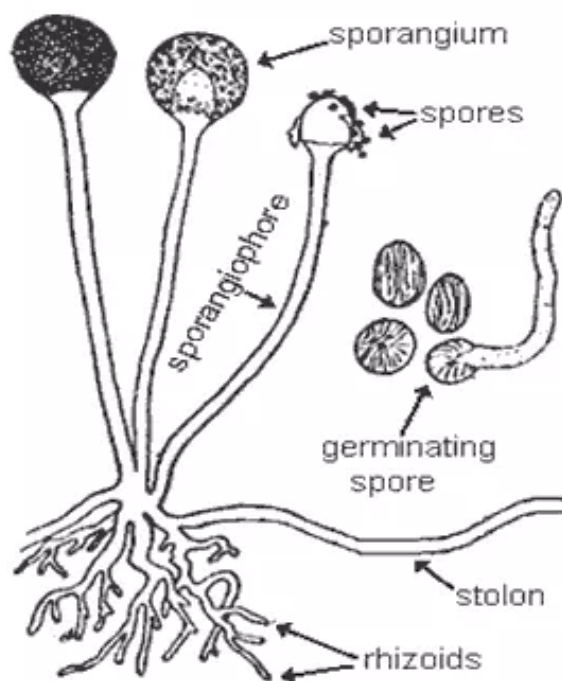
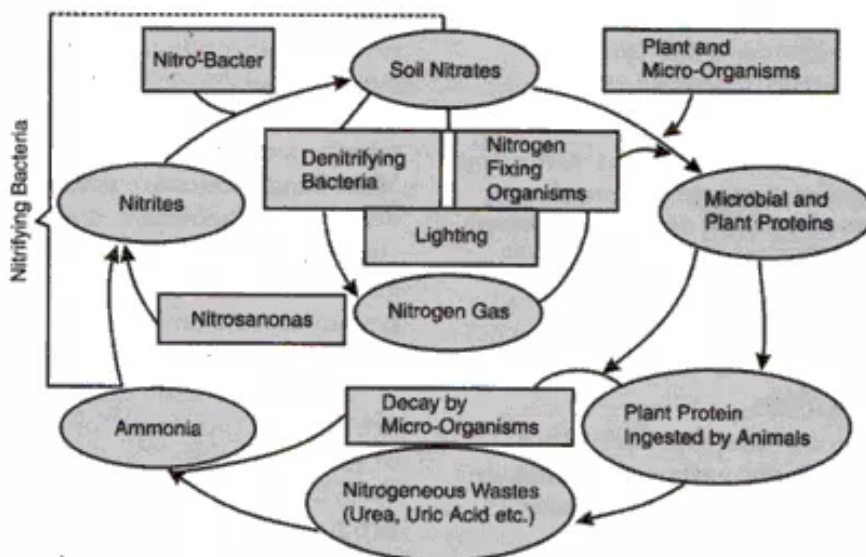


Diagram showing structure of Rhizopus

### Solution 5:

Bacteria plays an important role in nitrogen fixation. There are two types of nitrogen- fixing bacteria.

1. Symbiotic bacteria: *Rhizobium* is a symbiotic bacteria living in root nodules of leguminous plant which directly fix atmospheric nitrogen and convert them into nitrites and nitrates and make them available to the plant.
2. Free-living bacteria: Bacteria like *Azotobacter* and *Clostridium* live inside the soil and fix free nitrogen of the air and convert them into ammonia, amino- acids and proteins.



**Solution 6:**

(a)

| BACTERIA   | YEAST                              |
|--|------------------------------------|
| It belongs to kingdom Monera.  | It belongs to kingdom Fungi.       |
| It is a prokaryotic organism.  | It is an eukaryotic organism.      |
| Its cell wall made is up of carbohydrates, proteins, muramic acid etc. | Its cell wall is made up of chitin |
| It shows the presence of slimy capsule on the outside.                 | Slimy capsule is absent.           |

(b)

| GRAM POSITIVE BACTERIA  | GRAM NEGATIVE BACTERIA   |
|---|--|
| The bacteria which get stained with crystal violet and iodine solution are called gram positive bacteria. | The bacteria which do not get stained with crystal violet and iodine solution are called gram negative bacteria. |

(c)

| RHIZOPUS                                | MUCOR                               |
|---|-------------------------------------|
| They have rhizoids.                     | They do not have any rhizoids.      |
| Sporangiophores are usually unbranched. | Sporangiophores are often branched. |

(d)

| PARASITIC BACTERIA  | SAPROPHYTIC BACTERIA  |
|---|---|
| These bacteria live in or on the surface of other living organisms and take digested food from their hosts. | These bacteria feed on dead organic matter of plant and animal remains. |
| E.g. <i>Salmonella</i>  | E.g. <i>Bacillus</i>  |

**Solution 7:**

- (a) *Penicillium notatum*
- (b) *Aspergillus fumigatus*
- (c) *Candida albicans*
- (d) *Aspergillus*

**Solution 8:**

- (a) chitin
- (b) saprophytic
- (c) obligate aerobes
- (d) *Agaricus campestris*

### Solution 9:

Rust → crop disease

Typhoid → Bacterial disease

Coenocytic → *Rhizopus*

Aspergillosis → Fungal disease

Symbiotic → *Rhizobium*

Sporangiophore → Sporangia

Mycology → Study of fungi

Nitrifying bacteria → *Nitrobacter*

Antibiotic → Penicillin

### Solution 10:

Fungi are cooked like vegetables or used in pulao or prepared as soups. Some common edible fungi are *Agaricus*, *Ramaria*, *Clavaria*, *Morchella*.

Also yeast is used in preparing idli and dosa from a mixture of powdered rice and dal.

### Solution 11:

Yes. Many types of antibiotics are obtained from fungi which are used in medical sciences. Today about 25 types of antibiotics are commercially produced from moulds.

For example: Penicillin is obtained from the fungus *Penicillium notatum*.

Griseofulvin is extracted from the fungus *Penicillium griseofulvum*.

### Solution 12:

| Plant Disease          |   | Causal agent              |
|------------------------|---|---------------------------|
| Loose smut of wheat    | → | <i>Ustilago tritici</i>   |
| Leaf rust of sugarcane | → | <i>Puccinia saccharii</i> |

### Solution 13:

1. (b) Leeuwenhoek
2. (a) bacteria
3. (b) *Bacillus*
4. (a) Tuberculosis
5. (d) *Rhizobium*
6. (b) *Lactobacillus*
7. (d) *Agaricus*
8. (a) ethyl alcohol