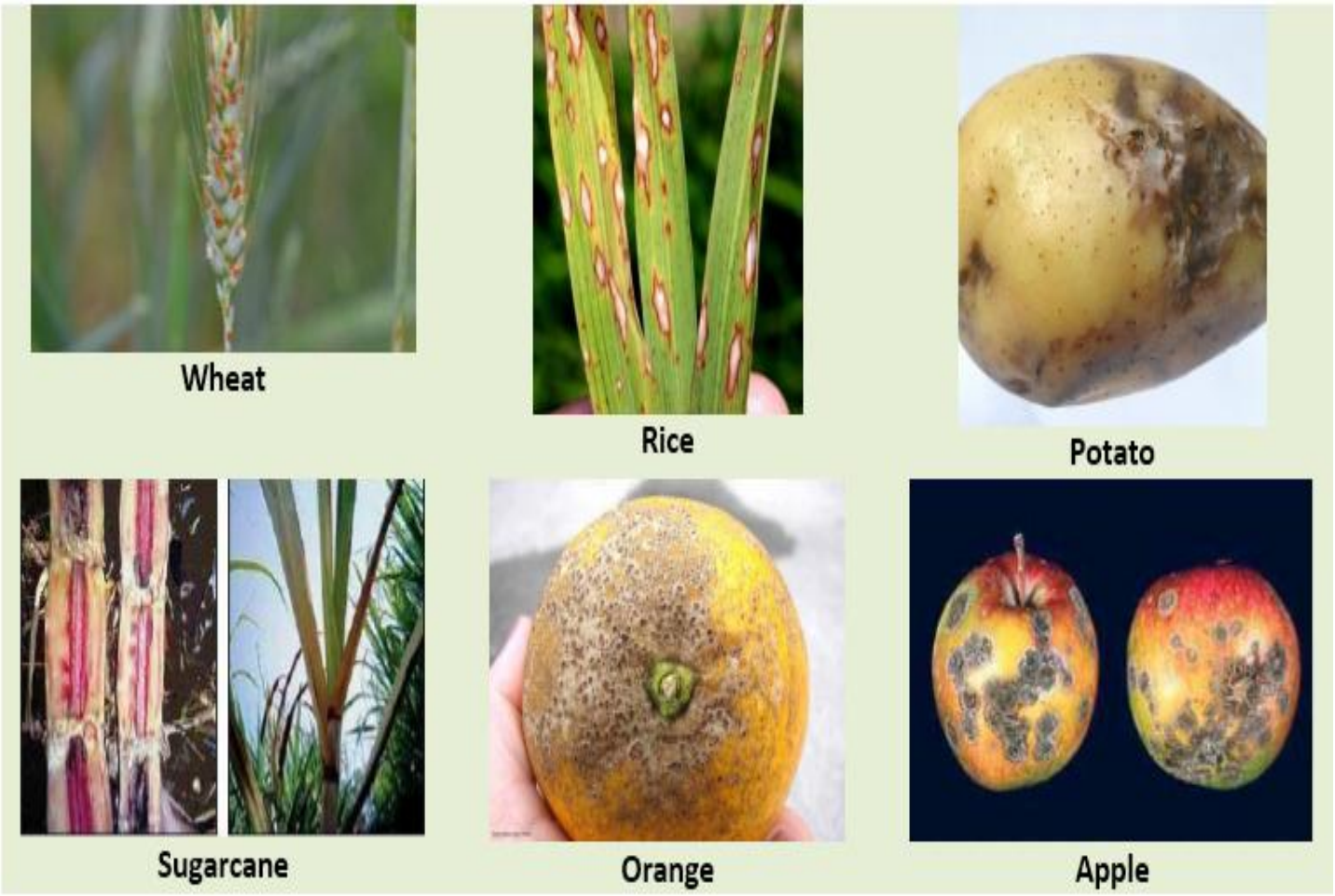
Diseases Caused by Microorganisms in Plants

Microorganisms can cause diseases in plants and reduce crop yield. Some of the plants in which they cause diseases are:



The plants can be protected by using chemicals that kill these microbes.

Common Diseases in Plants caused by Microbes

Citrus Canker is caused by Bacteria and spreads through **Air**.

Rust of Wheat is caused by Fungi and spreads through **Air or Seeds**.

Yellow Vein Mosaic of Okra (Bhindi) is caused by Virus and spreads through **Insects**.

Food Preservation

Why do we need to preserve food?

We need to preserve food because microorganisms that grow on food can sometimes produce toxic substances which are poisonous to us. If we consume this spoilt food, we can become seriously ill or die. Hence, we need to preserve food from being spoilt.

Common Methods of preserving food are:

Use of Preservatives

- Preservatives are used in pickles, jams and squashes to protect them from spoilage.
- Preservatives are common chemicals (such as salts and edible oils) that check the growth of microorganisms.
- In pickles, we add salt or acid preservatives.
- Two commonly used preservatives are sodium benzoate and sodium metabisulphite.

Use of Common Salt

- Meat and fish are covered with dry salt to check the growth of bacteria.
- Salt is also used to preserve tamarind, amla, raw mangoes etc.

Use of Sugar

- In jams, jellies and squashes, sugar is used as preservative.
- Sugar reduces the moisture content and hence, inhibits the bacteria from growing and spoiling food.

Use of Oil and Vinegar

- Oil and vinegar are added to pickles, fruits, vegetables, fish and meat as preservatives.
- Bacteria cannot survive in an environment with oil and vinegar.

Use of Hot and Cold Treatments

- Boiling milk lasts longer as boiling kills many microorganisms.
- Refrigerating food preserves as low temperature inhibits the growth of microbes.
- ***Pasteurisation*** *is the process by which milk is heated to about 70oC for 15 to 30 seconds and then, chilled suddenly before storing it. It prevents the growth of microbes. We can use pasteurised milk without boiling as it is free from harmful microbes.*
- **Pasteurisation was discovered by Louis Pasteur.**

Use of Sealed Air-tight Packets

- Dry fruits and vegetables are sold in air-tight packets as microbes cannot survive without air. Hence, the food does not get spoilt in air tight packets.

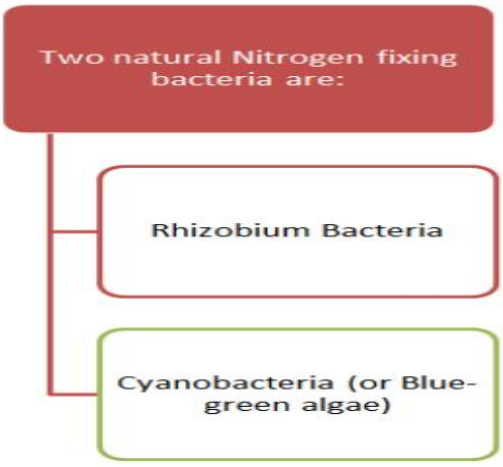
Nitrogen Fixation

Nitrogen constitutes 78% of our atmosphere.

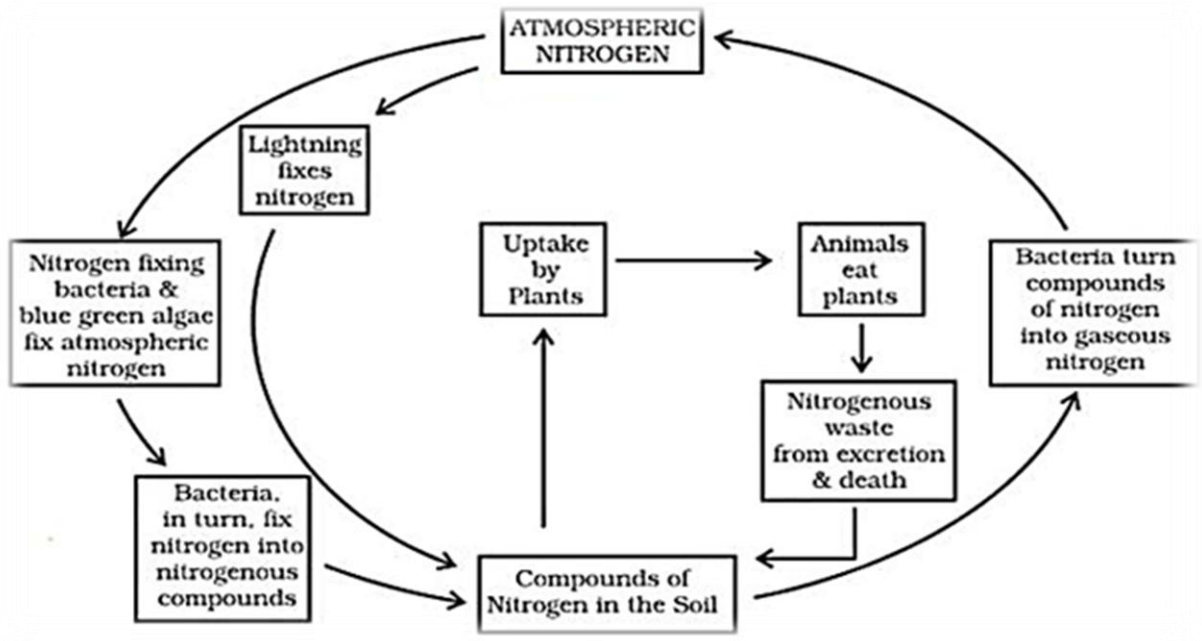
In living organisms, it is found in:

- Proteins,
- Nucleic Acids,
- Chlorophyll, and
- Vitamins.

Atmospheric nitrogen cannot be used directly by the plants and animals. It gets fixed by either lightning or natural nitrogen fixers.



Nitrogen Cycle:



A step-by-step explanation of Nitrogen Cycle:

- **Nitrogen Fixation**: Atmospheric nitrogen is converted by lightning or certain bacteria like *Rhizobium*, *Azotobacter* and blue-green algae (present in soil) into compounds usable by plants.
- **Nitrification**: Ammonia conversion into nitrites by *Nitrosomonas* and further conversion of nitrites into nitrates by *Nitrobacter*. Plants take up nitrogen in form of ammonia or nitrates.
- **Assimilation**: Roots of plants absorb these nitrogenous compounds from soils and plants use them to synthesize proteins and other compounds.
- Animals feeding on plants get these proteins and nitrogen compounds.
- **Ammonification**: When plants and animals die, bacteria and fungi present in the soil convert the nitrogenous wastes into compounds that can be used by plants again.
- **Denitrification**:Nitrates can be converted into nitrogen gas which is released back in the atmosphere by certain bacteria. Eg. *Pseudomonas*

Hence, atmospheric nitrogen remains constant.

****Thanks****