



INTRODUCTION TO FOOD MICROBIOLOGY

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Microbes - Definition



Living organism too small to be seen with naked eye but visible under a microscope. Ex. Bacteria, Fungi, Viruses

Microbiology-Definition

- Microbiology is the study of microorganisms, which are unicellular or cell-cluster microscopic organisms.
- A scientist who specializes in the area of microbiology is called a microbiologist.

Food Microbiology - Definition

A laboratory setting with a person in a white lab coat and gloves working with various glassware and petri dishes containing cultures. The person is holding a glass dish with a yellowish substance. In the foreground, there are several petri dishes with different colored cultures (pink, yellow, red) and a larger dish with a pinkish substance. The background is slightly blurred, showing more laboratory equipment.

Food microbiology is the study of the Microorganisms that inhabit, create, or contaminate food.

ROLE OF MICROORGANISMS IN FOOD



- Micro-organisms, in relation to food, can have one of these 2 roles:

1) Food Spoilage

2) Food Production

FOOD SPOILAGE-Meaning

- Food Spoilage means the original nutritional value, Texture and Flavor of the food are damaged, the food become harmful to people and unable to eat.

- Food spoilage.

is a condition of contaminate food due to:
growth of microorganisms in food
OR

The action of microbial heat stable enzymes

-Spoilage leads to wastage of food and economic loss.

FACTORS DETERMINING THE SPOILAGE

A laboratory setting with a person in a white lab coat and gloves working with petri dishes and a glass dish containing a pinkish substance. The person is using a pipette to transfer liquid from the glass dish into a petri dish. The background is slightly blurred, showing various laboratory equipment like beakers and flasks.

- Intrinsic factors
 - » pH
 - » Water activity
 - » Redox potential
 - » Antimicrobial substance
- Extrinsic factors
 - » Temperature
 - » Relative humidity
 - » Atmosphere

• **Anthracnose**, usually caused by *Colletotrichum lindemuthianum*, *C. coccodes*, and other species. The defect is a spotting of leaves and fruit.



Bacterial soft rot on Capsicum



Bacterial fruit blotch on Watermelon



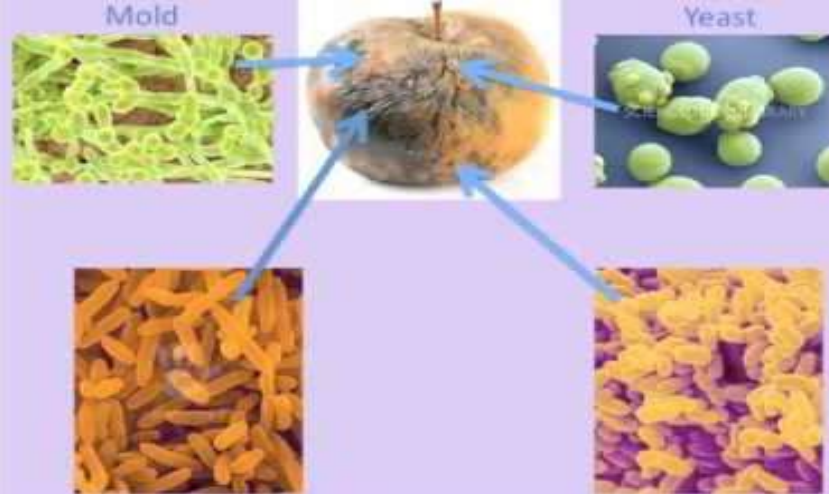
Bacterial spot on Capsicum



Bacterial wilt



Bacterial canker



Storage rot in grapes caused by *Botrytis cinerea*.



Storage rot in strawberry caused by *Botrytis cinerea*.



Blue mould rot in tomato caused by *Penicillium* spp. (also by *Fusarium* spp.)



Black mummy rot of grapes caused by *Guignardia bidwellii*




Watery soft rot in apple caused by *Sclerotinia sclerotiorum*.



Blue mould on oranges caused by *Penicillium digitatum*.

Reasons to Prevent Spoilage

- Deterioration leads to Food wasting
 - Contaminated food could be poisoning
 - Money save
 - Ensuring availability of food
 - Saving nutritive value
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- A scientist in a white lab coat and white gloves is working in a laboratory. They are holding a glass dish containing a pinkish substance, possibly a food sample, and using a pipette to transfer liquid from it into a petri dish. In the foreground, there are several other petri dishes, some containing pinkish and yellowish substances, and a white plate with a large piece of pinkish food. The background is slightly blurred, showing more laboratory equipment.

Prevention of Food Spoilage

More modern techniques of preventing spoilage include

- Canning
- Pasteurization
- Irradiation
- Aseptic packaging
- Modified atmosphere packaging
- High-pressure processing

Food Production

A good example of microorganism usage in food production is the process of **Fermentation**, which results in the production of organic acids, alcohols and esters. These help to either:

- Preserve the food
- generate distinctive new food products

Fermentation

- Fermentation is a process when microorganisms are grown on a large scale to obtain a useful product.
- These help to either:
 - i) Preserve the food
 - ii) Generate distinctive new food products

Fermented foods are **foods** that have been through a process of lactofermentation in which natural bacteria feed on the sugar and starch in the **food** creating lactic acid.

Fermented Food Benefits



Removes toxins and harmful bacteria



Introduces beneficial bacteria (probiotics) that balance our natural bacterial colonies



Improves digestion and bowel health



Improves overall immunity (happy gut, happy body)



Helps our bodies absorb more of the live nutrients in our food

Fermented foods



Yoghurt



Soy sauce



Beer



Kefir



Temph



Idli



Cheese



Sauerkraut

THANK YOU

