

# Introduction to microbiology and common micro-organism

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## MICROBIOLOGY-

The study of unicellular or cell-cluster microorganisms is termed as microbiology.

The term microbiology was introduced by Louis Pasteur (French chemist) who demonstrated that fermentation was caused by the growth of yeasts.

The word Microbiology was derived from Greek word.

Mikros-Small

Bios-Life

Logia-Study

Microbiology is the specific area, concerned with the study of microbes that are too small and can not be seen without magnification

## Branch of Microbiology-

Microbiology is the Largest most complex branch of biological science it deals with many diverse biological disciplines.

Branch Name	Study
Bacteriology	To study of bacteria.
Mycology	To the study of fungi microscopic eukaryotic form.
Virology	To study of virus

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Protozoology	To study of Protozoans
Microbial Ecology	To the study of interrelationships between microbes environments
Epidemiology Public Health	To study of control and spread of diseases in communities

### Scope of Microbiology-

#### Production of Antibiotics-

- Micro-organism are directly used in pharmaceutical industry for the production of antibiotics by isolating antibiotic producing micro-organism from nature.

#### Diagnosis of disease and treatment-

- Eg :- Widal test, Elisa test etc.

#### Sterilization-

- This process involves killing of microbes by different means to make the pharmaceutical product free from microorganism.

#### Testing of Pharmaceuticals –

- Endotoxin testing
- Microbiological assays of antibiotics
- Antimicrobial preservation efficacy testing

#### Plant growth promotion-

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*Rhizobium*, *Azotobacter*, *Pseudomonas* as species of microbes are present in soil to participate in soil fertility, herbicidal resistance, insect resistance enhancement of quality of plant products.

### Common micro-organism Of Microbiology

Microbiology includes a larger and diverse group of microscopic organisms that exist as a single cell of bacteria, archaea, fungi algae, protozoa and helminths the viruses.

#### 1. Moulds:

- Mucor, Rhizopus, Botrytis, Aspergillus, Penicillium etc is moulds deteriorate the food.
- The manufacturing of certain food and other related Substance some specific species of mould are used mould ripened cheese, production of oriental foods (Soy, Sauce, miso, etc.)

#### 2. Yeast:

- They are mostly non-filamentous & reproduce by fission or budding.
- They maybe both harmful as well useful for food in food industry.
- **Example:-** Yeast is used in food industry are *Saccharomyces*, *Schizosaccharomyces*, *Candida*, *Kluyveromyces* etc.

#### 3. Bacteria:

Bacteria can also be harmful & beneficial for food and food industry.

##### Example :-

- a. **Bacillus Coagulan:-** A proteolytic species used for curdling of milk.
- b. **Bacillus Purimilus:-** Recommended test organism in sterility testing.
- c. **Microbacterium lacticum:-** Used in production of Vitamines.

#### 4. Amylases:-

These are used in the preparation of starch hydrolysates used in various product formations.

Example:- Beer, Vinegar etc.

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# Epidemiology

### Introduction:

It is the branch of medical sciences that investigates all the factors that determine the presence or absence of diseases and disorders.

Epidemiology literally meaning the study of what is upon the people is derived from greek word.

**Epi-** upon, among

**demos** - people, district

**logos** - study

### Application of Epidemiology:

- To evaluate health services
- To diagnose the health of the community.
- To identify the syndrome.
- To search for cause of disease.
- Planning and Evaluation
- Elucidate mechanism of disease transmission
- To find causation of the disease.
- Determine the mode of transmission.

### Epidemic:

- It is define as the large number of people or animals suffering from the same disease at the same time.

### Pendemic:-

- It Is define as the growth rate skyrockets and each day grow more than the day prior.

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- The virus has nothing to do with virology, population immunity or disease severity.
- It means a virus covers a wide area, affecting several countries and populations.

### Endemic:-

- A disease outbreak is endemic when it is consistently present but limited a particular region.
- The disease spread and rates predictable

**Eg: malaria**

### Modes of transmission

An infectious agent may be transmitted from its natural reservoir to a susceptible host in different ways. There are different classifications for modes of transmission. Here is one classification:

#### Direct

Direct contact

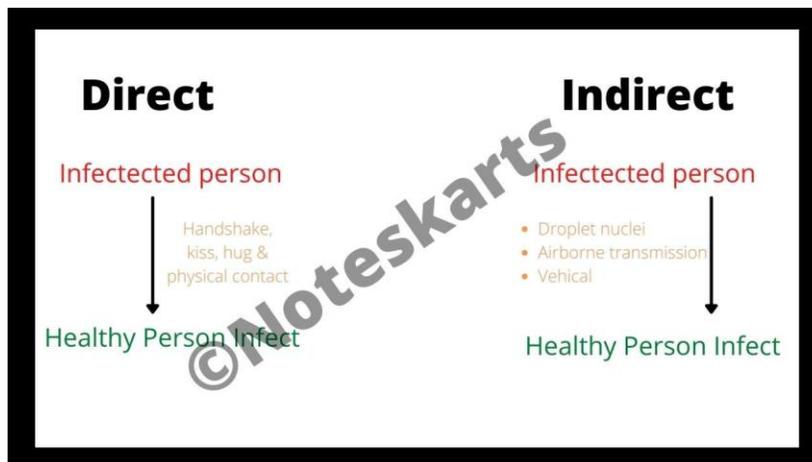
- Droplet spread

#### Indirect

- Airborne
- Vehicleborne
- Vectorborne (mechanical or biologic)

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Isolation separates sick people with a contagious disease from people who are not sick.

Quarantine separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick.

### Incubation period:

The time elapsed between exposure to a pathogen's organism, a chemical, or radiation and when symptoms and signs are first apparent.

The period of time between harmful bacteria or viruses entering a person's and animal body or entering a plant and the effects of a disease.

### Contact tracing

- People in close contact with someone who is infected with a virus, such as the Ebola virus, are at higher risk of becoming infected themselves, and of potentially further infecting others.
- Closely watching these contacts after exposure to an infected person will help the contacts to get care and treatment, and will prevent further transmission of the virus. This monitoring process is called contact tracing.