

Sterilization

Sterilization : is the process that completely destroys of all microbial life , including spores.

OR

: is the complete destruction of all microbial forms, it includes both spore and vegetative cells from the surface of an object.

Classification of Sterilization:

Sterilization is classified into 2 types: physical and chemical sterilization.

Chemical Methods of Sterilization:

Gaseous Sterilization: The gaseous chemical agents used for sterilization: formaldehyde and ozone.

Liquid Sterilization: Common liquid chemical agents that are used for sterilization include: hydrogen peroxide and hypochlorite solution.

Physical Methods of Sterilization:

A. HEAT :

1. Dry heat

* **Incineration:**

technique of destroying contaminated material by burning them in incinerator.

*** Red heat**

Sterilized by Bunsen burner till they become redness in flame.

Uses : bacteriological loops, straight wires, tips of forceps and spatulas.

***Flaming**

method of passing the over a Bunsen flame, but not heating it to redness•

Uses: mouth of test tubes, flasks & glass slides .

*** Hot air oven**

Uses : Metallic tools (like :Forceps &scissors).

Glasswares (such as petri dishes, pipettes & flasks)

Unsuitable for rubber and plastics.

2. Moist heat

Sterilization by moist heat:

- A temperature below than 100 C° (<100)
- Temperature of 100 C
- A temperature greater than 100 C (>100)

Pasteurization :

Originally developed by Louis Pasteur

Uses: process used in the disinfect food and dairy industry.

Two methods of pasteurization :

holder method (heated at 63 C ° for 30 minutes)

flash method (heated at 72 C ° for 20 seconds)

followed

by quickly cooling to 13 C°

Uses : a mild heat treatment of Milk, cream, yogurt..

Liquid Eggs: Used to reduce Salmonella risk.

Boiling At temperature 100 C° :

Boiling for 10 - 30 minutes kills most vegetative bacteria and
Viruses.

Some bacterial spores are resistant to boiling and survive.

Steaming at 100 C° (Tyndallization) :is done in steam sterilizer for 30
minutes

followed by incubation at 37 C overnight.

Repeated for another 2 successive days.

Uses : sterilization of media like those containing sugar, milk, gelatin.

* **Autoclave (steam sterilization)** - most effective for sterilization (121°C , 15-20 mins.)

- **The principle :** autoclave producing steam under pressure aids in penetration.

Uses :

- Liquids & Media : culture media in glass container , buffers, normal saline and water.
- Surgical instruments + lab equipment: which come into contact with spores, especially if the sample is soil.
- Plastics : pipette tips , plastic tubes .
- Filter paper.
- Bio-waste.

- Good quality of rubber like gloves.

B- FILTRATION:

- Does not kill microbes, but it separates them from liquids.
- Membrane filters with pore sizes between 0.2- 0.45 μm
- Composed of cellulose.

Uses: Removing bacteria from the ingredients of fluids such as: culture media.

C- Sunlight:

Sunlight has an active germicidal effect due to its content of ultraviolet rays. It is natural method of sterilization in cases of water in tanks, rivers and lakes.

