

STERILIZATION AND DISINFECTIONS

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Sterilization

sterilization is **The removal** of all living microorganisms
.including bacteria and their spores, fungi, parasites and viruses

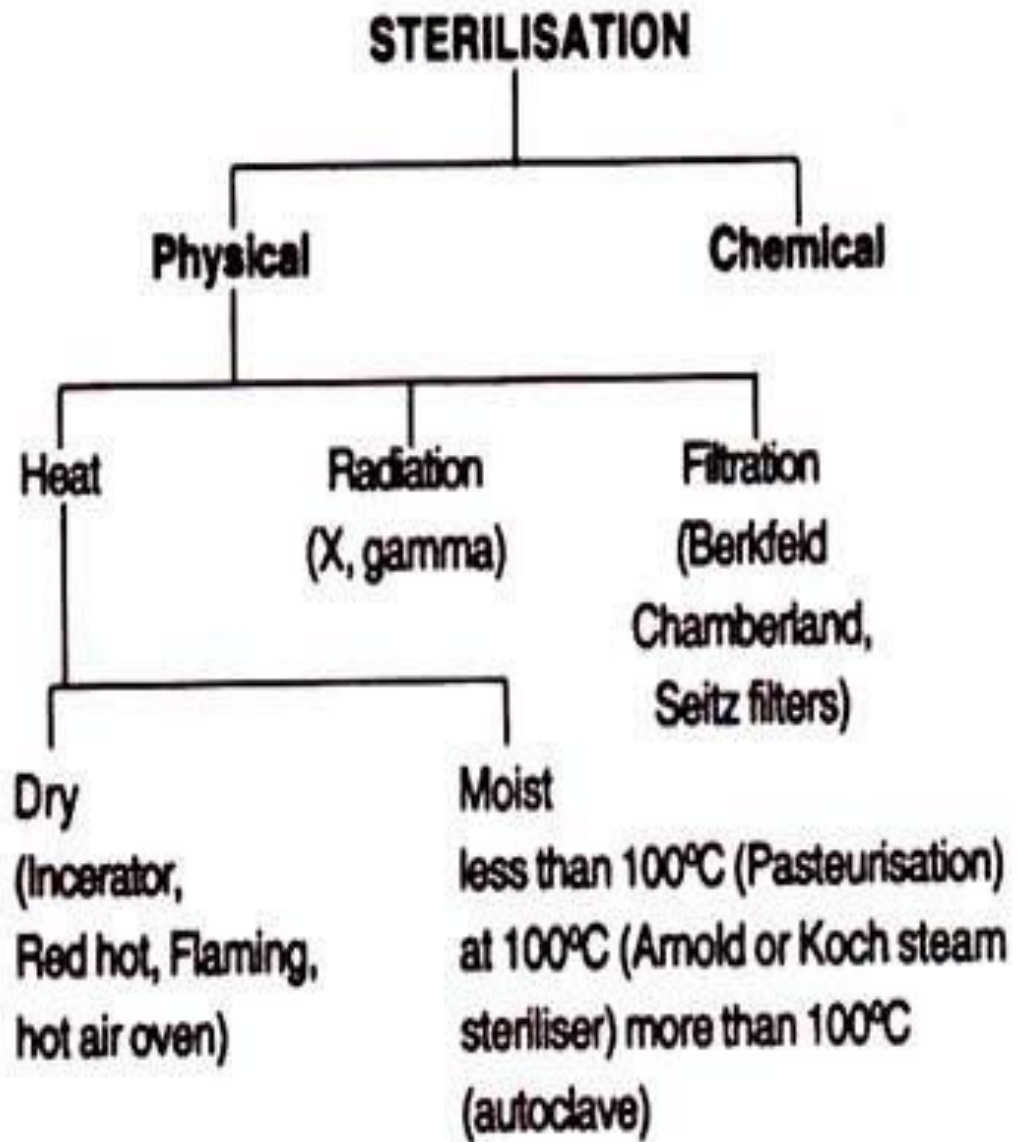
.Therefore, Sterilization means germ **free** objects

Sterilization

:Sterilization occurs by

Physical methods & Chemical methods

Methods of sterilization



Physical methods

:Heat

Exposure of the objects to heat will kills microbes by coagulation of protein, denaturation of enzymes and .oxidation

:Filtration

Sterilization through removing of microbes from fluids by exposing to small size filter. Used for heat sensitive .fluids like serum, antibiotic, suger, and urea

:Radiation

Exposure to irradiation causes denaturation of proteins .and enzymes

sterilization by heat

Heat

```
graph TD; Heat[Heat] --> DryHeat[Dry heat]; Heat --> MoistHeat[Moist heat];
```

Dry heat

Moist heat

Dry heat

Dry heat

Red hot

Flaming

Hot air
oven

Incineration

Red hot

Exposure of wires and forceps to the Bunsen flame until it becomes red hot, then cool down and .use

.Used for **loop**, **forceps**, and **metal rods**

Flaming

Slowly passing of an objects to the Bunsen flame
.will reduce the number of microorganisms

Used for sterilization of **the mouth of bottle, flasks,**
.,., smear slides etc

Flaming



Hot air oven

.Instruments consist of heater, oven

.Used for **sand, powder, metal, glass**

:Thermal death point and Thermal death time

.160C for 60 min

.180C for 30 min

Incineration

Is treating of an objects to heating over 250 until become

.black

.Done for used equipment

```
graph TD; A[Moist heat] --- B[Less than 100C]; A --- C[At 100C]; A --- D[Above 100C]
```

Moist heat

Less than
100C

At 100C

Above 100C

Less than 100C

:Pasteurization of milk

Holding method (65C for 30 min)

:Preparation of vaccine

.By heating at 56C for 30-60 min

At 100 C

:Steaming

Single exposure of the microbe to steam at 100C for 90
.min

:Boiling

Boiling water is the most common form of application of moist heat but is not capable of killing endospores or killing all viruses

.At 100° C for 30 min

Above 100C (Autoclaving)

.Depends on **steam** and **pressure**

Steam is a hot air able to

.penetrate through things

Pressure will rise the

.temperature from 100C to 121C

Moist heat is **more effective** than dry heat. also more penetrating than dry heat

Make complete killing of bacteria, their spores, fungi and their spores, parasites and viruses including Envelop and non Envelop

..virus



Above 100C (Autoclaving)

:Thermal death point and thermal death time
.121C for 15 - 20 min

Radiation

Sterilization by radiation kills microbes by causing mutation to the cellular protein and disrupting cellular elements

:Types of radiation

.UV (not a good sterilizing method) (1

ionizing , most medical disposables (syringes, (2
.needles)

Filtration

Sterilization by **mechanical removal** of pathogenic microorganism by passing through membrane filter. Unable .to filter viruses according to their small size

.The pore size is less than $0.45\ \mu\text{m}$ (bacteria size $100\text{-}1\ \mu\text{m}$)

Used for sterilization of **heat sensitive fluids** like **serum**,
. **glucose**, **urea**, and **Amino acids**

DISINFECTION

Chemical methods of sterilization

:Disinfection

Is **removing** of pathogenic microorganism **or reducing** their number
.on the exposed area

Unable to destroy spores and some could not kill non envelop
.viruses

:Antiseptic*

.is a chemical agent that is applied to living tissue to kill microbes

:Factors affects disinfection action

- .Type of disinfection
- .Concentration of disinfectant
 - .Type of microorganism
 - .Number of microorganism
 - .Time of exposure
 - .Temperature

:Phenolic group of disinfectant

.E.g.: Phenol crystal, Dittol, Lysol, Cresol

Remain active, stable and persist for long period*

.of time

Active against G+ve, G-ve, Mycobacterium &

.viruses

:Alcohols

.E.g.: Anti-bacterial, sanitizer

They are able to act and Evaporate in a short period of
.time

:Dyes

.E.g.: Crystal violet and Eosine are very effective antiseptic

:Surface active agents

Soap and other detergent make **mechanical remove of**
microbe by scrubbing of dead tissue so **reduce their**
.number

Thank you

