

- pathogenic (virulent gene ✓)

(No virulent gene).



Sterilization:

destruction of all forms of life.

Disinfection:

" " " " except for "SPORE" - State

Methods of S & D.

i) physical

- A) Heat
- B) filtration
- C) Radiation.

Heat labile materials are sterilized.

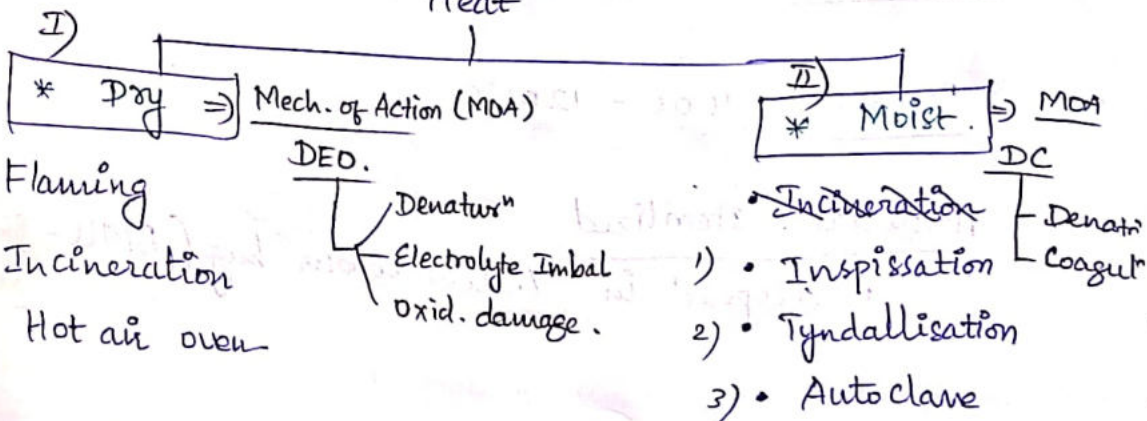
ii) Chemical

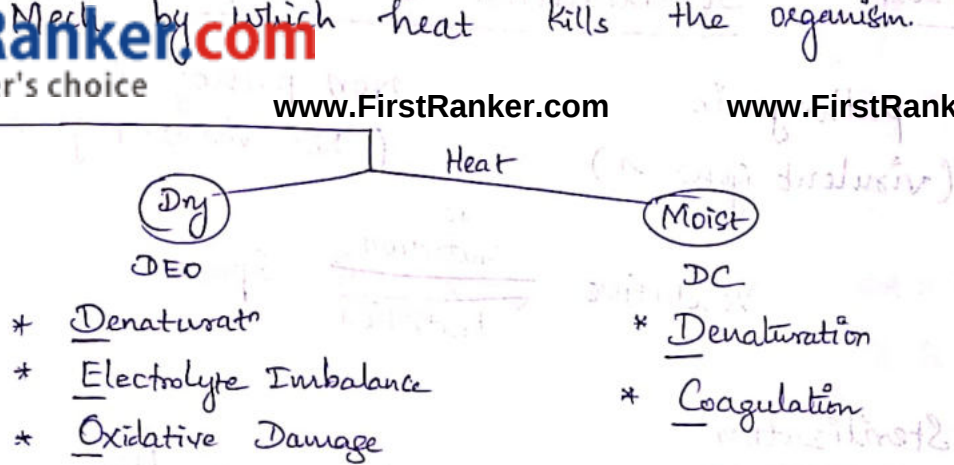
FDA classf.

- * High
- * Low
- * Intermed.

A) HEAT

Heat

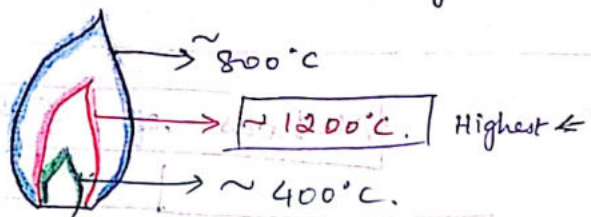




I)
Dry Heat

1) Flaming:

- * exposing the materials till they are Red hot
- * Temp:



Materials sterilized:

- * Innoculation loops & wires.



These are used to take the org. from the colony

2) Incineration burnt to Ashes.

Temp: 1000 - 1200°C.

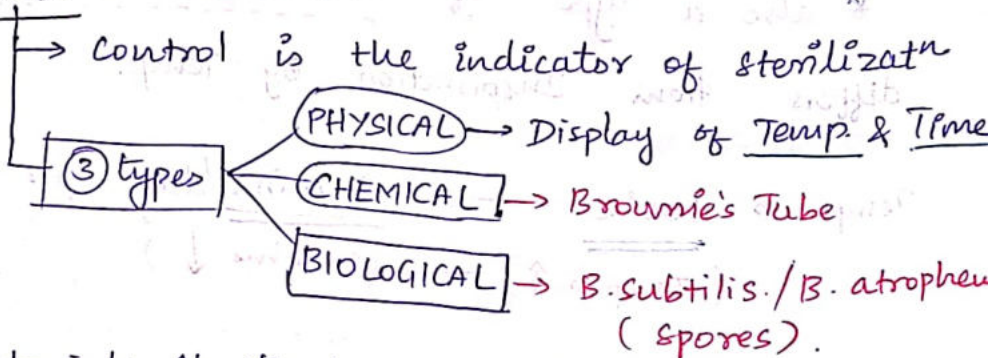
Materials: sterilized.

- * disposed in Yellow colour bag (BMW - Biomed. Waste Management)

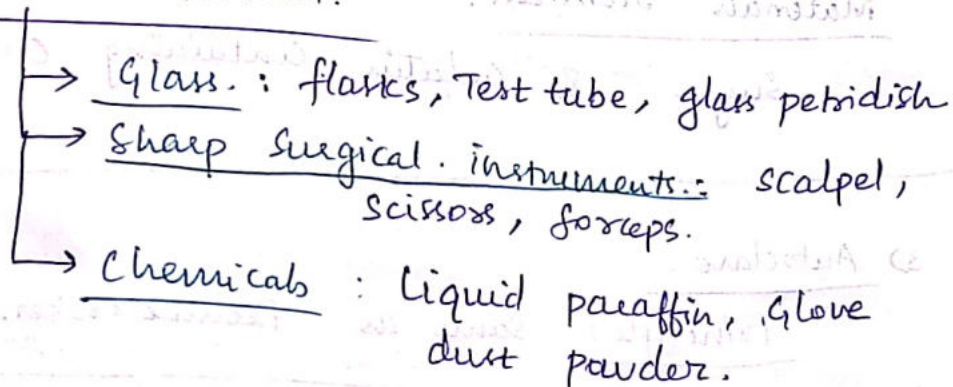
* After autoclave, instruments (used in lab) are sterilized by this method.

* Temp: $160^{\circ}\text{C} \rightarrow 2\text{hrs.}$

* Controls:



* Materials Sterilized.



II) Moist Heat

1) Inspissation:

* aka "Intermittent sterilization" why?
Bcoz we sterilize here for 3 days.

* Temp: $80 - 85^{\circ}\text{C} \rightarrow 30\text{mins/day for 3days.}$

Why we sterilize Intermitt. (30mins) for 3 days?

* To kill the ~~spores~~ Vegetative state

* But ~~Vegetative~~ ^{spore} state is not killed directly

Materials sterilized: serum & egg containing culture media

Day ①: Spores are present, which get converted to Vegetative state by consuming Nutrition from culture & get killed.

Day ②: More spores $\rightarrow$ Veg. state $\xrightarrow{30\text{min}}$ killed.

2) Tyndallisation:

* also a type of "Intermittent Sterilization" but differs from Inspissation by Temp.

Temp $\rightarrow 100^{\circ}\text{C} \rightarrow \underline{20\text{mins/day}}$ for 3 days.
(Temp is $\uparrow$) $\rightarrow$ (So Time $\downarrow$)

Materials Sterilized:

Sugar & Gelatin containing culture media.

3) Autoclave:

m/c - most common

Principle: Same as Pressure Cooker.

m/c used.

Temp: $\underline{121^{\circ}\text{C}} \rightarrow 15\text{mins} \rightarrow 15\text{pounds psi.}$
 $+5\downarrow$ $+5\downarrow$ $+5\downarrow$
 $126^{\circ}\text{C} \rightarrow 10\text{mins} \rightarrow 20\text{pounds psi.}$
 $+6\downarrow$ $+10\downarrow$
 $132^{\circ}\text{C} \rightarrow 3\text{mins} \rightarrow 30\text{pounds psi.}$
 (when "T" is $\uparrow$, time is $\downarrow$, P is $\uparrow$)

Controls:

② types

(i) Physical: Display Temp. & time.

(ii) Chemical: Autoclave Tapes.

(iii) Biological: Geobacillus stearo-thermo.phillus.

MATERIALS: (i) all culture media except those sterilised by above methods.
 $\uparrow$ Ster. by Hot Air oven. (2) methods.

(ii) All surgical instrum. except "SHARPS" & Catgut suture (st. by Radiation).

(iii) Chemicals: Plastic & Rubber.

(Foleys catheter, Gloves, Plastic Syringe).

Summary:

Moist Heat: - Used to sterilize all culture media.

eg: Inspissation - Serum & egg cont. culture med.

Tyndallisation - sugar & gelatin " "

Autoclave - All culture med except above ②

B) FILTRATION [Heat "labile" materials (Liq. & Gas) that can't be sterilized by Dry & Moist Heat, can be...]

* No Temp. is used.

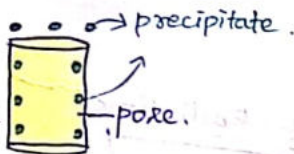
* MOA: larger particles are separated from smaller by filtration.

Control: *Serratia marcescens*.

Materials sterilized Heat labile materials (Liq. & Gas).

② types of filters used

DEPTH



* pores filter the materials throughout the depth

eg: Candle filter
Asbestos "
Sintered "

↓ m/c used in

Food & Chemical industry

MEMBRANE

used in Health industry



* pores filters the materials at the surface alone.

pore size $\rightarrow 0.22 - 0.45 \mu$.

materials filt.: Serum, vaccines, Antibodies, Antibiotics.

- Surgical & N-95 Masks are also based on Memb. filter.
- Also used in Biosafety cabinets

HEPA filters (or)
ULPA filters.

Next Page.

Efficiency $\rightarrow$ 99.97%

minimum
Particulate
Size filtered. $\rightarrow$ 0.3 μ m.

ULPA filter.

99.99%

0.12 μ m. *

used in Biosafety cabinets $\rightarrow$ used in lab
to handle Harmful microbes, so that
we shouldn't get infected.

C) RADIATION

* SOLID Heat labile materials are sterilized.

* No Heat / Temp. used.

* MOA: Nucleic acid damage.

* Control: B. pumilis.

(2) types of Radiations

IONIZING aka "Cold sterilization"

- High penetration power.

Radiation used : X-rays
Y-rays.

Materials sterilized :

- * Catgut suture
- * Disposable items.

Non-Ionizing

- low penetration power

- IR rays.

UV rays.

used in : SURFACE DISINFECTION

OTs & Biosafety Cabinets