



Principle of Microbiology
(Practical)

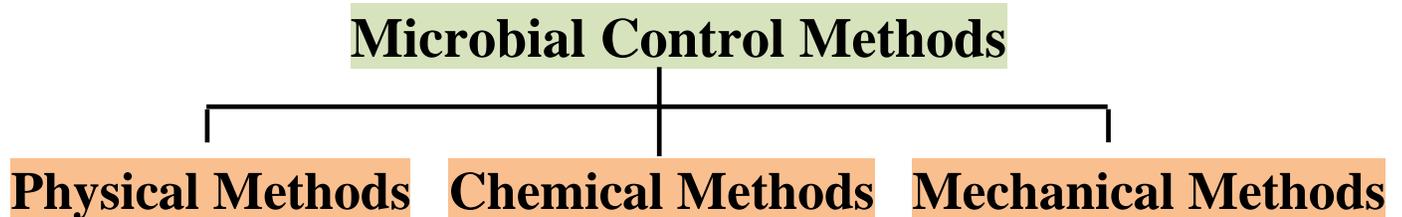
Lecture 3

Controlling of Microbial Growth

Methods of destroy, remove or inhibit the growth of microorganisms

Aim of the lecture

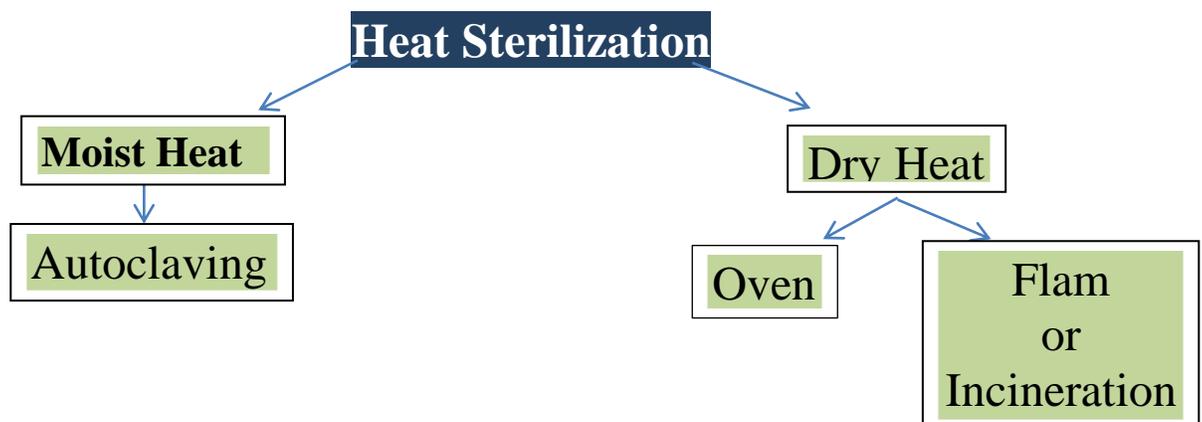
- To study the different methods used to control the growth of microorganisms.



❖ Physical methods

Sterilization: is a process that kills all forms of microbial life, including bacterial spores, which are highly resistant.

1. Heat Sterilization:



-Moist Heat

Autoclaving

An autoclave is a pressurized chamber used for sterilization by combining three factors: time, pressure, and steam. It uses steam under pressure as its sterilization agent at approx. 121 °C temperature and 15 lb./in² pressure for about 15–30 min.

(Autoclave uses)
sterilizing:

Glassware,
culture media,
liquids,
and many other things



Types of Culture Media



Dry Heat

Sterilizing oven

Hot air ovens are equipment that uses dry heat to sterilize temperature of 160 °C to 180 °C for 2-1.5 hours

(Oven uses)
sterilizing:

glassware, metal wares, oils, powders; etc...

APPLICATIONS OF HOT AIR OVEN				
				
Used to sterilize the metal equipments	Commonly used in laboratories to perform research-based operation	Used in many industries for the drying, baking and curing processes	Used to sterilize powders and other non-volatile compounds	Used to sterilize the heat-stable glasswares

BIOLOGY READER

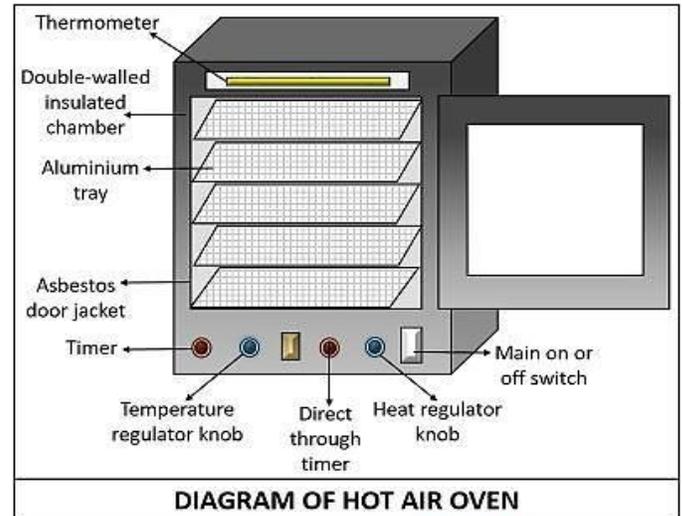
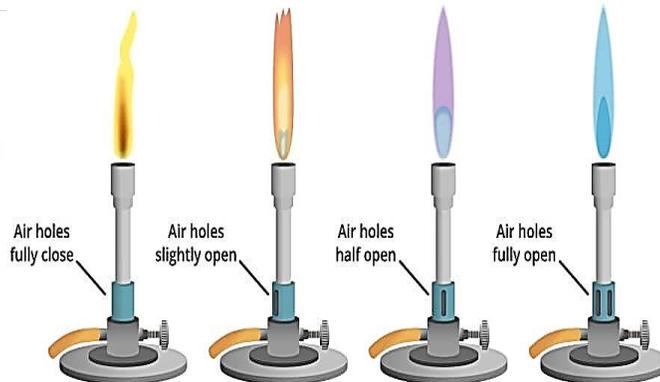


DIAGRAM OF HOT AIR OVEN

BIOLOGY READER

Flame

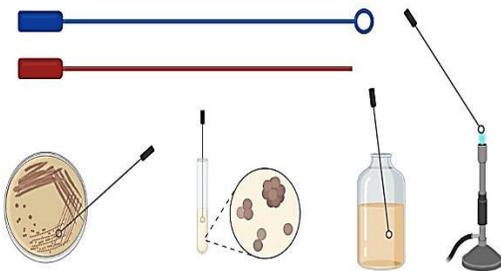
Holding Inoculation loop, Forceps and spatulas in a Bunsen flame till they are **red hot**.



(Flame uses)
sterilizing:

Loop

Inoculating Loops and Needles



Forceps



Spatulas



❖ Chemical Methods

a. disruption of the cell membrane [ex: alcohol, detergent, phenol]

b. modification of proteins [ex: chlorine, iodine, hydrogen peroxide, formaldehyde]

• **Alcohol:** 70% aqueous solution of ethyl alcohol and isopropyl alcohol.

Uses

- Disinfection of surfaces and clinical thermometer.
- Disinfection of the skin and Venipuncture.

• **Phenol:** 1-2% (aqueous solution)



❖ Mechanical Methods:

Filtration:

The pore size for filtering bacteria, yeasts, and fungi is in the range of 0.22-0.45 μm

Uses:

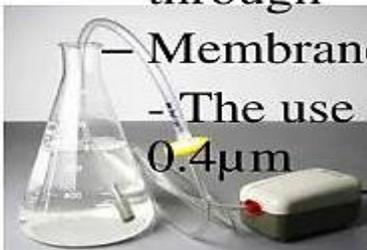
Used to sterilize heat sensitive liquids and air in hospital isolation units and industrial clean rooms.

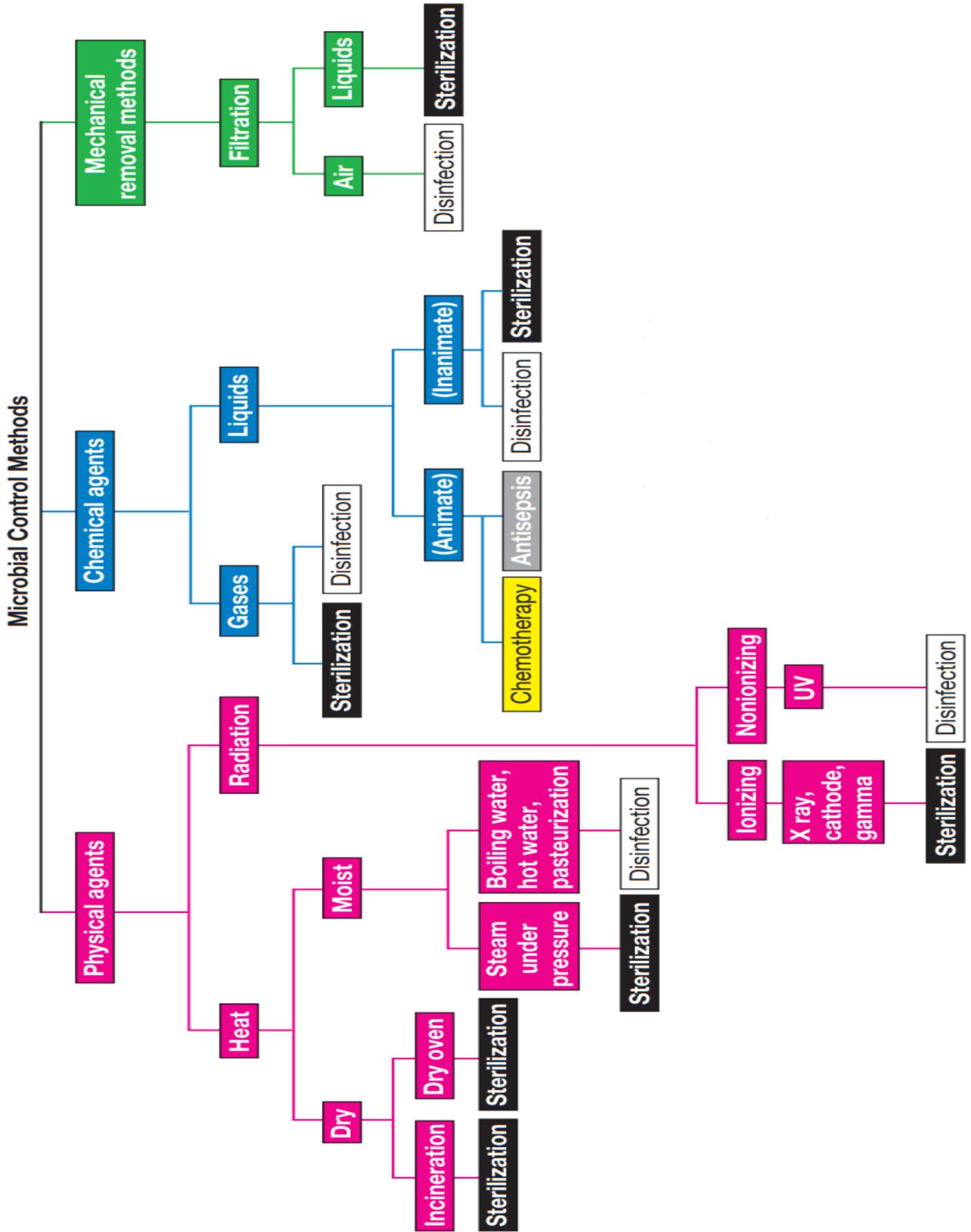
• Fluids

- solutions of antibiotics, vitamins, tissue extracts, animal serum, etc.
- Depth filters
 - able to retain microorganisms while allowing fluids to pass through

– Membrane Filter

- The use of graded pore size 0.2-0.4 μm





المصادر:

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