

SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai

Approved by Pharmacy Council of India, New Delhi.

Coimbatore -641035

COURSE NAME : PHARMACEUTICAL MICROBIOLOGY - BP303 T

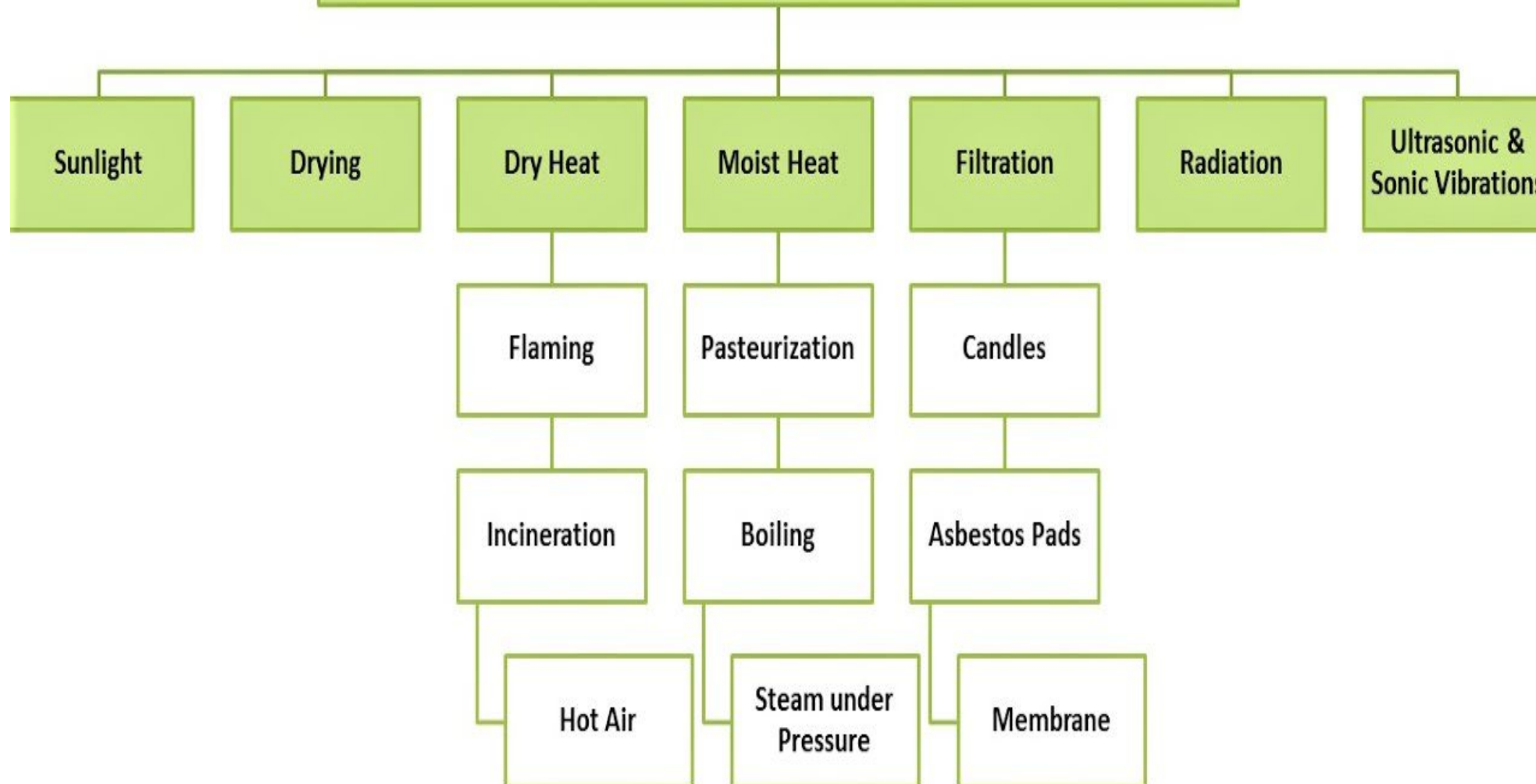
B.PHARM II YEAR / III SEM

UNIT 2

SUB TOPIC : STERILIZATION METHODS,EFFICIENCY AND INDICATORS



Physical Method of Sterilization



Hot air oven



incinerator



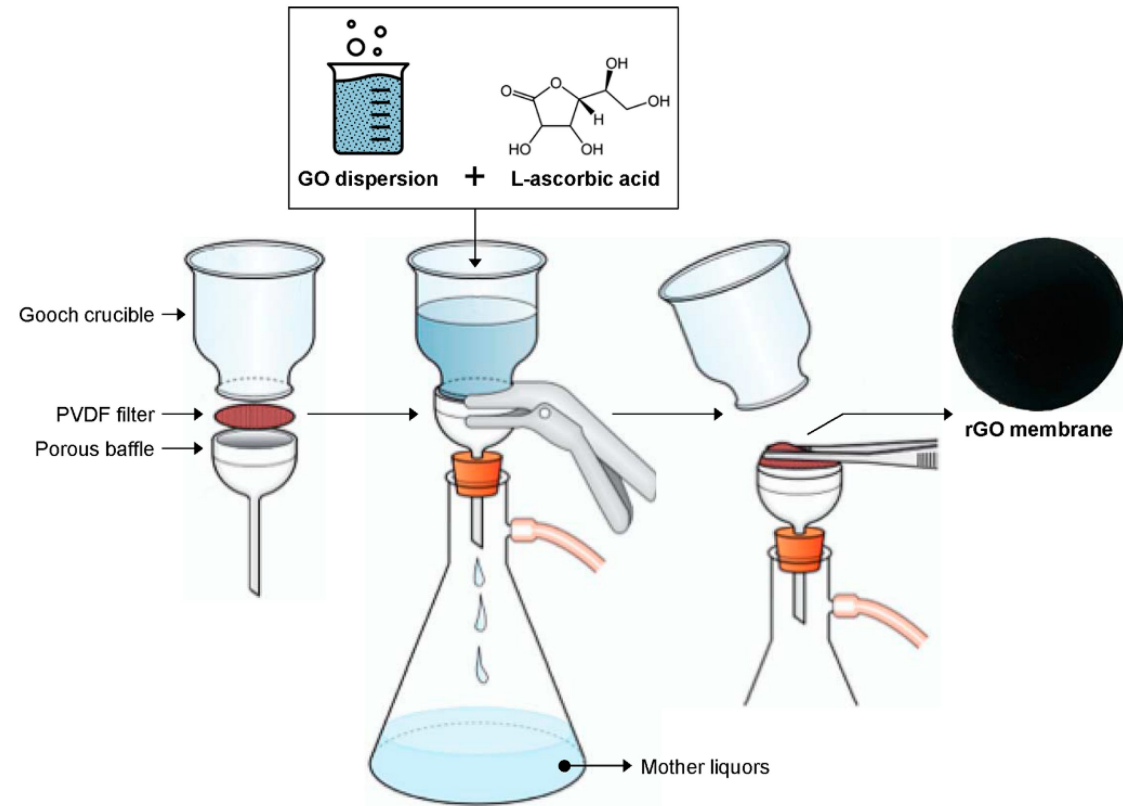
Autoclave



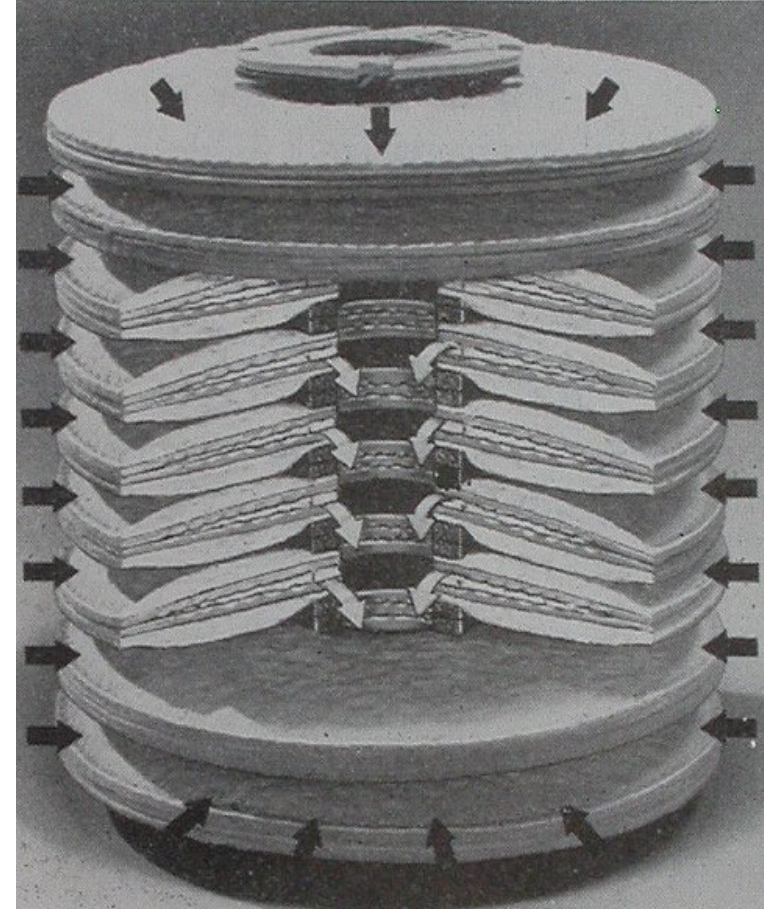
Pasteurization machine



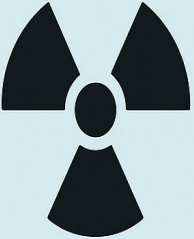
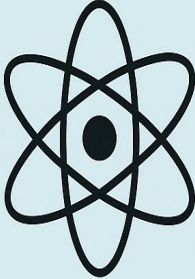
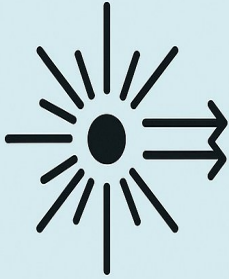
Membrane filter



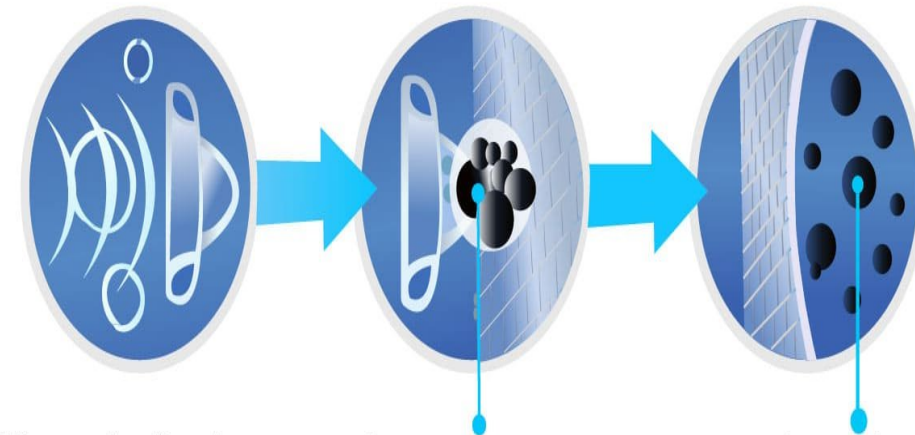
Asbestos pads



TYPES OF RADIATION STERILIZATION IN PHARMACEUTICALS

		
GAMMA RAYS	ELECTRON BEAM	X-RAYS

Ultrasonic Cleaning Principle

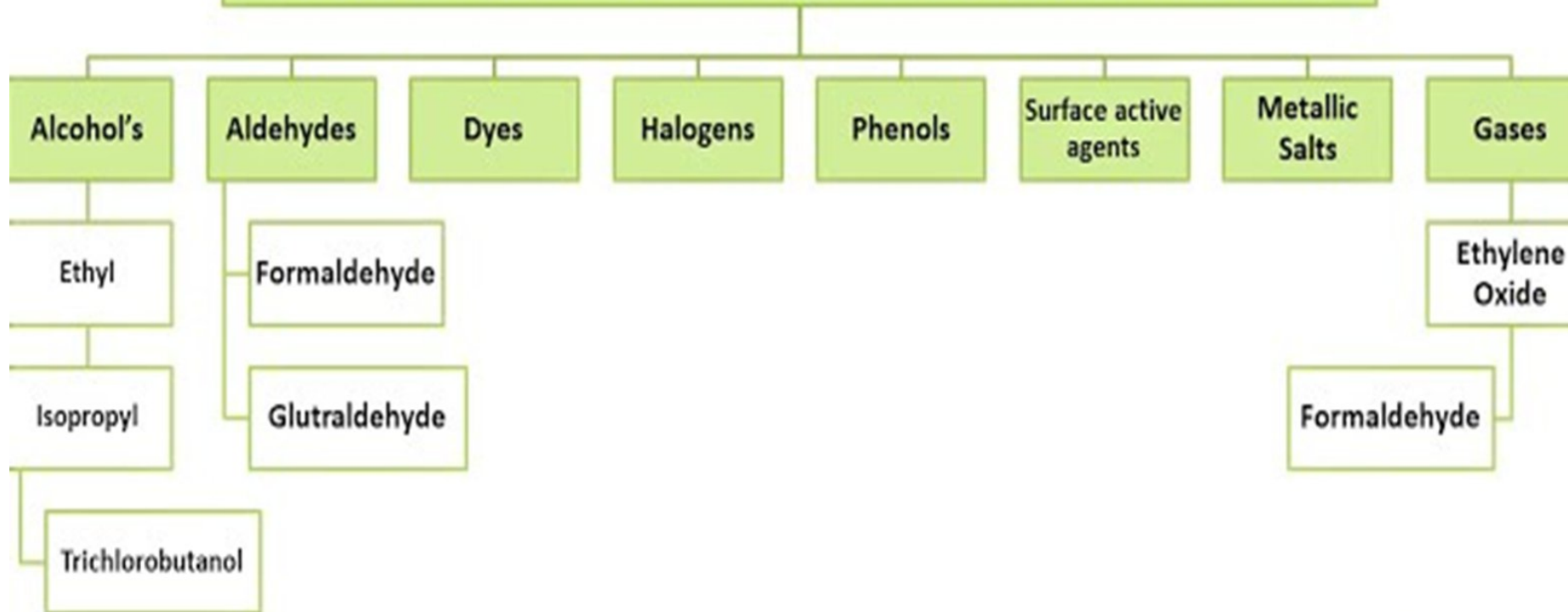


Ultrasonic vibration
producing high speed

Voids explode on
the surface of the fabric

The implosion
disintegrated the debris

Chemical Method of Sterilization





**Ethylene Oxide
Sterilization**



**Hydrogen
Peroxide Plasma
Sterilization**



**Glutaraldehyde
Sterilization**



**Peracetic Acid
Sterilization**




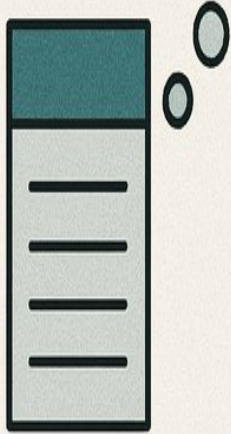


**Formaldehyde
Sterilization**

EVALUATION OF THE EFFICIENCY OF STERILIZATION METHODS

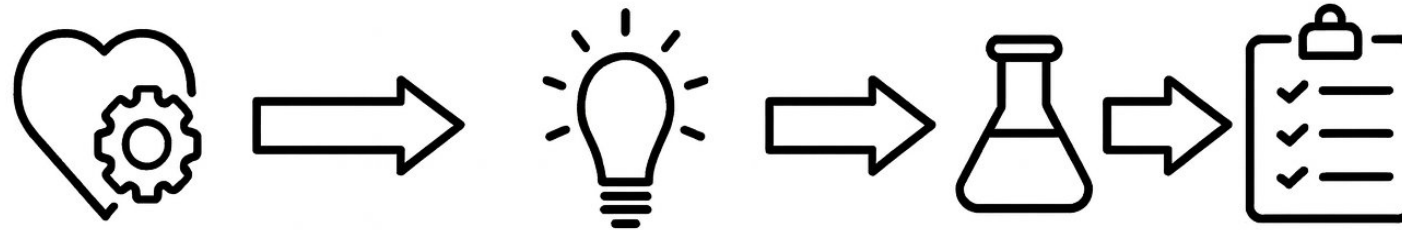
Method	Indicator	Efficiency
Moist heat	<i>Geobacillus stearothermophilus</i>	Very high
Dry heat	<i>Geobacillus stearothermophilus</i>	High
Filtration	Pore size (0,2 µm)	Medium
Radiation	<i>Bacillus pumilus</i>	High

Monitoring methods

THERMOCOUPLES	PRESSURE	HUMIDITY LOGS	BUBBLE POINT TEST
			

KEY METRICS FOR HEAT STERILIZATION

D-VALUE	Z-VALUE	F-VALUE
		



Empathize

Understand the needs of healthcare workers, lab technicians, and facility managers. Interview hospital staff about sterilization challenges (e.g., time, safety). Observe processes in clinics or food industries to identify inefficiencies. Empathize with users needing reliable, safe sterilization methods.

IDEATE

Brainstorm creative sterilization methods.

- Eco-friendly steam sterilization with reduced water use.
- Portable UV radiation devices for small-scale use.
- Non-toxic chemical sterilization for sensitive equipment.

Prototype

Create testable models of new sterilization methods.

- Develop a low-energy steam sterilization protocol.
- Build a handheld UV sterilization wand.

Test

Evaluate prototypes in real world settings and refine.

- Test methods in hospitals or labs for effectiveness and safety.
- Gather feedback on usability and speed from users.
- Iterate to improve efficiency and reduce costs.

ASSESSMENT QUESTIONS

Question 1

The Steam Zap Challenge

Professor Sparkle needs to clean a pile of surgical tools in a hospital. She wants to use super-hot steam under pressure to kill all germs. Which sterilization method should she choose?



- a) Dry Heat Sterilization
- b) Steam Sterilization
- c) Radiation Sterilization
- d) Chemical Sterilization

Question 2: The Fire Oven Mission

The Crew has to sterilize glass bottles that can handle high heat without water. Which method uses a blazing hot oven to burn germs away?

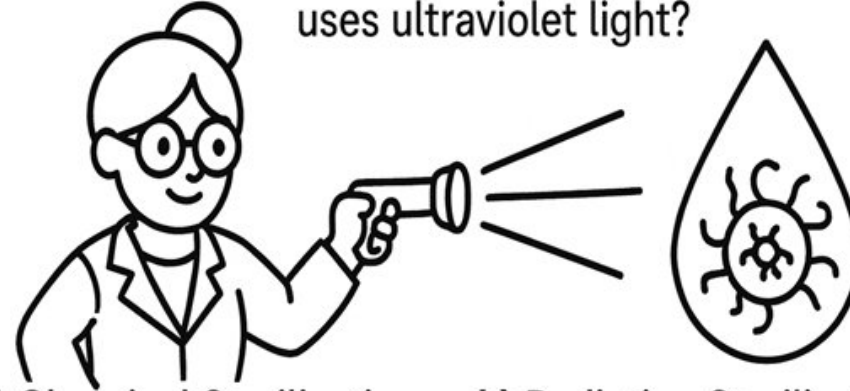


- a) Filtration Sterilization
- c) Gas Sterilization

- b) Dry Heat Sterilization
- d) Steam Sterilization

Question 3: The Light Beam Battle

In Sparkle City's water factory, germs are hiding in the water. Professor Sparkle decides to use powerful light rays to destroy them. Which sterilization method uses ultraviolet light?



- a) Chemical Sterilization
- b) Radiation Sterilization
- c) Dry Heat Sterilization
- d) Filtration Sterilization

THE GAS CLOUD QUEST

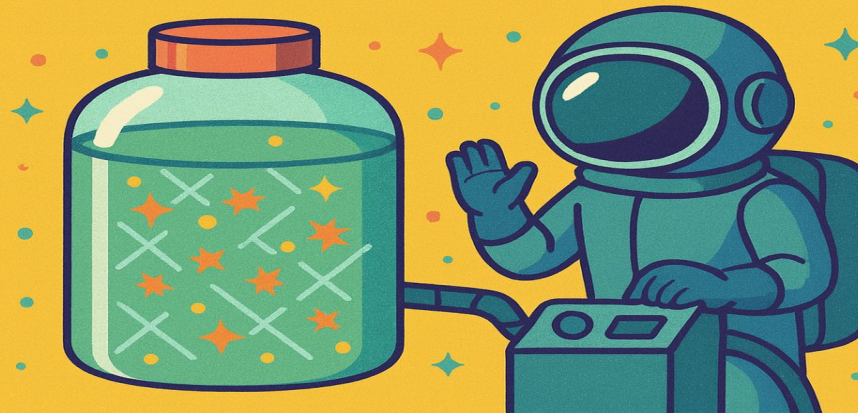
Some delicate tools can't handle heat or water, so the Crew uses a special gas to wipe out germs. Which method uses a gas like ethylene oxide to sterilize equipment?



- a) Steam Sterilization
- b) Gas Sterilization
- c) Radiation Sterilization
- d) Dry Heat Sterilization

THE FILTER TRAP ADVENTURE

The Crew needs to make a big batch of liquid medicine germ-free without using heat or chemicals, Which method uses super-fine filters to trap bacteria?



- a) Filtration Sterilization
- b) Steam Sterilization
- c) Dry Heat Sterilization

REFERENCES :

- 1.W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Ananthanarayan : Text Book of Microbiology, Orient-Longman, Chennai

