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STERILISATION

Gaseous sterilization

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CHEMICAL METHOD OF STERILISATION

Sterilization by heating with a bactericide:

- This method is used for sterilizing aqueous Preparations which are unstable at higher temperature attained in the moist heat sterilization processes.
- The method has a lower margin of safety & should be used only when moist heat sterilization is not applicable.
- In this method, API is dissolved or suspended in a suitable solution of bactericide & the preparation is transferred into the final container, sealed & heated at 98 to 100°C. for 30 mint in boiling water.



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Gaseous Sterilization :

- In this sterilization method chemicals is used in gaseous condition.
- In olden days formaldehyde is used for sterilization but now a days ethylene oxide use for sterilization.
- In olden days, it was used in special chamber to sterilize catheters, syringes & other hospital equipment. - Now a days it is used for the fumigation of empty rooms after infectious diseases.

Ethylene oxide:

- It is easily dissolved in water & organic solvent.
- It can be liquefied easily & the liquid boils at 10.8°C
- It is highly inflammable so it is used by:



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1. Mixing ethylene oxide with some inert gas in a fixed ratio

- Ethylene oxide = 1 part with Carbon dioxide= 9 parts
- Ethylene oxide = 12% w/w with Dichlorodifluoromethane =88% w/w
- Sterilization done in chamber which can be heated to the desired degree of temp.
- The material to be sterilized is packed in the chamber & is treated with a sterilizing mixture for the stated time.

2. Using ethylene oxide in the absence of air

- The exposure is carried out in an evacuated sterilizer at subatmospheric pressure.
- Ethylene oxide or mixture containing 90% ethylene oxide & 10% carbon dioxide is used as sterilizing agent.



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FACTORS INFLUENCING EFFICIENCY OF ETHYLENE OXIDE :

1. Temperature :

Sterilization can be done at room tem. But it takes a long time. It is very effective at the temp. of 40⁰C.

2. Concentration :

It is very effective concentration between 200 mg to 1 g / lit.

3. Relative humidity :

Sufficient moisture is needed during exposure to ethylene oxide. Generally 40 to 50% moisture is necessary to have the maximum efficiency of ethylene oxide as a sterilizing agent.



4. Power of penetration :

It has a high penetration power, it penetrates through rubbers, paper, plastics, fabrics.

5. Absorption :

Many materials absorb ethylene oxide. The sterilized articles can not be used until the absorbed gas has escaped. The amount of absorption depends on the nature, thickness, surface area of the article & their wrapping & the size of load.

Advantages

- The method is very reliable.
- It is a very reactive compound, but it causes damage to only a few materials.
- It is suitable for heat sensitive substances because sterilization is effective at room temperature.



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Disadvantages

- The method is slow.
- The running costs are high.
- A lot of precautions are required to be taken to use ethylene oxide because it is highly inflammable and toxic.

Applications

- This method is used for sterilization of thermolabile materials, such as, rubber and plastic item.
- The method is suitable for sterilization of instruments, metallic equipment, syringes and needles.