

AIR AND MEDIA STERILIZATION

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AIR AND MEDIA STERILIZATION

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I N T R O D U C T I O N

- Sterilization is a term referring to any process that eliminates (removes) or kills all forms of life, including transmissible agents such as fungi, bacteria, viruses, spore forms, etc.
- There are many sterilizing agents e. g. steam, U.V. light, chemical agents, etc.
- Steam is preferred to other agents, because it is cheaper for mass sterilization.

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Terjesen & cherry	1902	First studied the sterilization of large volume of air.
Bourdillon <i>et al.</i>	1917	Developed the air sterility technique.

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- Sterilization removes infecting micro-organisms
it can also remove pathogenic micro-organisms
or spoiling agents.
- Sterilization is accomplished either by chemical or
physical means.
- Moist heat is a most common physical agent.
- It allows for satisfactory industrial sterilization.

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- The other method of sterilization is the removal of infecting micro-organisms.
- This is done by filtration. Numerous type of filter papers are available for this purpose.
- It depends on the-
 - (i)- The size of micro-organisms and
 - (ii)-The retention efficiency of the filter.
- Usually sterilization of gases and biostatic fluids is done by filtration.

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- Usually media are sterilized before they are inoculated.
- Sterilization of media is decided by the chemical composition.
- Sterilization of media may be done by one of the following three methods-
 - (i)-by boiling
 - (ii)-by passing live steam
 - (iii)-by subjecting the medium to steam under pressure(i.e. autoclaving)

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➤ The classical technique of making the medium sterile by the use of steam may be carried out in two ways-

(i)-batch wise in fermentor and

(ii)-continuous sterilization

BATCH WISE IN FERMENTOR

➤ This is the simplest method of sterilizing production media.

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- The vessel is equipped with a coil or jacket for heating and cooling.
- Also the agitator may be fitted to aid heat-exchange.
- It is needed to raise the temperature of the medium to 120°C with steam to maintain this for a period of 20 minutes before cooling the system.

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- There is an interconnecting pipeline between the batch the batch cooker and the fermentor for transferring the sterile medium from the cooker to steam sterilized fermentor.

ADVANTAGE

- The batch cooker method saves the production time, since the fermentor is unoccupied between two fermentor runs.

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LIMITATION

- It occupies increased plant space.
- It involve higher cost of the additional equipment required, and
- It involves increased steam usages.

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CONTINUOUS STERILIZATION

- This method involves passing of production medium through a heat exchanger, a holding coil and a cooler.
- The temperature of medium undergoing sterilization is raised to the desired level in the heat exchanger.
- The medium is then passes on to a holding coil.

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- Where it is maintained at the sterilizing temperature for a predetermined time period.
- Finally the medium is rapidly cooled by counter circulating it in the exchanger against the cool input medium, and then against cold water.
- In continuous sterilization the temperature is higher than 120°C .

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ADVANTAGES

- It saves both production time and plant space.
- It gives improved quality of the medium.
- It involves some economy in steam cost.
- It allows the use of lower sterilizing temperature or shorter holding period.

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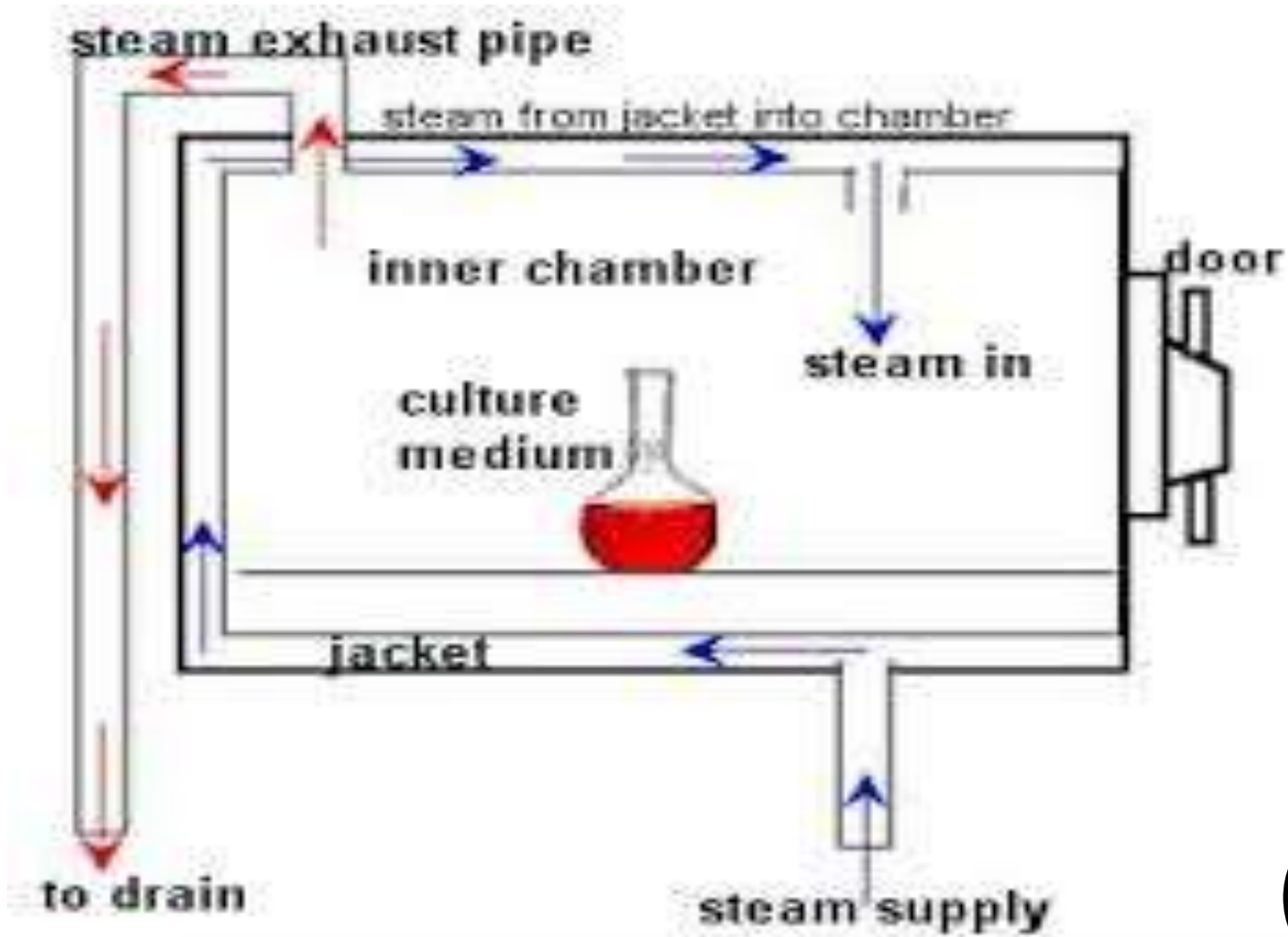


Fig. no. 1-Media sterilization.

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- With aerobic fermentation continuous supply of sterile air is vital for successful fermentation.

- Air can be sterilized by many methods namely-
 - (i)-filtration
 - (ii)-heat
 - (iii)-electrostatic repulsion
 - (iv)-U.V. light
 - (iv)-chemical agents

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A I R S T E R I L I Z A T I O N

- The sterilization of air in fermentation industries is widely carried out by the filtration method.
- For sterilizing large volumes of air was studied by Terjesen and cherry.
- They used a performed slab wool 3 inches thick.
- The air velocity through the slab was kept below 1ft./sec. to avoid channeling through the slag wool material.

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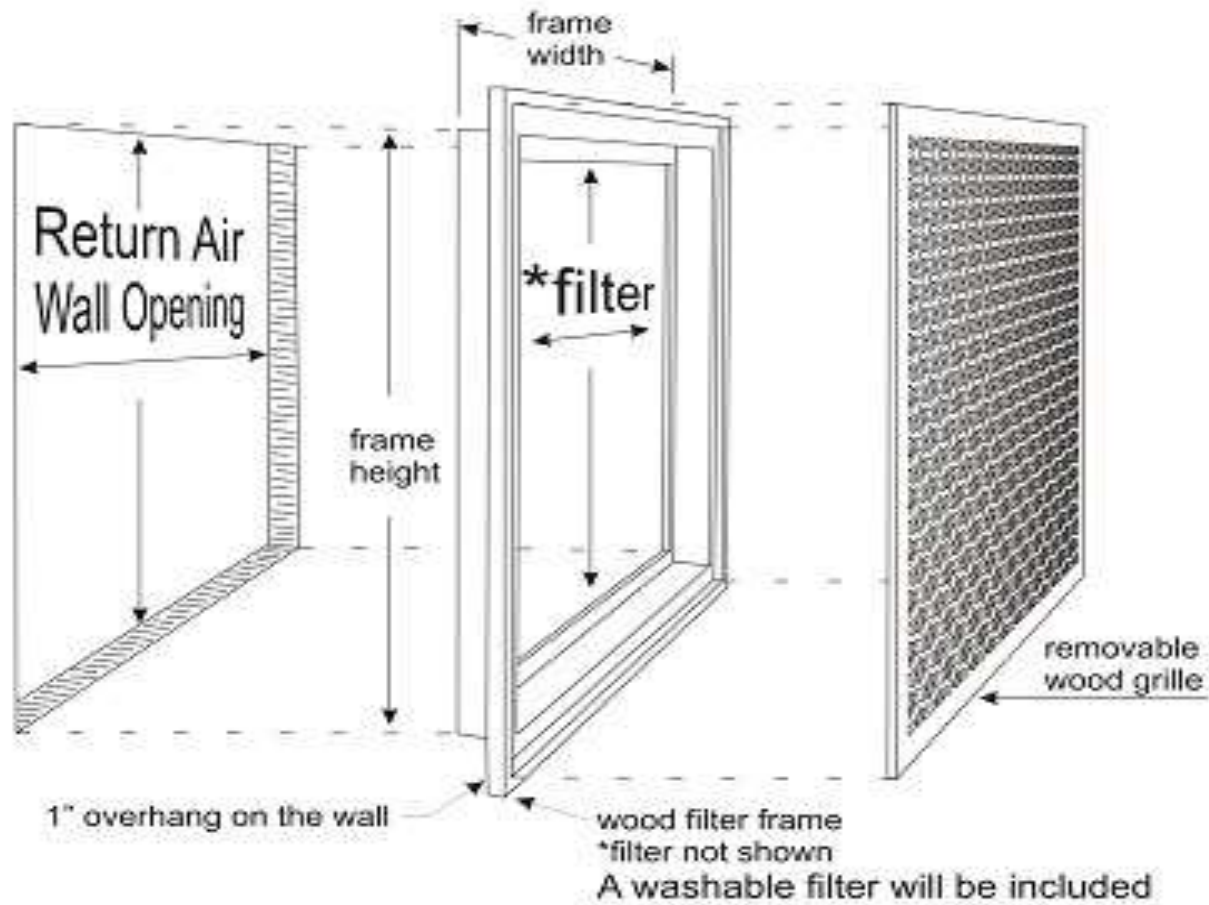


Fig. no. 2-Air sterilization.

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➤ A. H. Patel 2010 industrial microbiology

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➤ Some contents from net-

<http://www.sigmaaldrich.com>

<http://www.air-zone.com/hepa.html>

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