

Growth medium and Principles of (Sterilization and Disinfection)

Culture medium or growth medium : is a liquid or gel designed to support the growth of microorganisms. There are different types of media suitable for growing different types of cells.

Classification of culture media used in Microbiology laboratory on the basis of consistency

1-Solid medium

Advantages of solid media: (a) Bacteria may be identified by studying the colony character, (b) Mixed bacteria can be separated. Solid media is used for the isolation of bacteria as pure culture.

'Agar' is most commonly used to prepare solid media at a concentration of 1.5-2.0%. Agar is polysaccharide extract obtained from seaweed.



2- Semisolid media

They are prepared with agar at concentrations of 0.5% or less. They have soft custard like consistency and are useful for the cultivation of **microaerophilic bacteria** or for **determination of bacterial motility**.

3- Liquid (Broth) medium

These media contains specific amounts of nutrients but don't have trace of gelling agents such as **gelatin** or **agar**. Broth medium serves various purposes such as propagation of large number of organisms, fermentation studies, and various other tests. e.g. sugar fermentation tests, **MR-VR broth**.



Classification of culture media used in Microbiology laboratory on the basis Chemical Composition :

1. Routine Laboratory Media

2. Synthetic Media. These are chemically defined media prepared from pure chemical substances. It is used in research work.

ROUTINE LABORATORY MEDIA

These are classified into six types: (1) Basal media, (2) Enriched media, (3) Selective media, (4) Indicator media, (5) Transport media, and (6) Storage media.

1. BASAL MEDIA. Basal media are those that may be used for growth (culture) of bacteria that do not need enrichment of the media. Examples: **Nutrient agar** .

2. ENRICHED MEDIA. The media are enriched usually by adding blood, serum or egg. Examples: Enriched media are **blood agar** and **chocolate agar**.

3. SELECTIVE MEDIA. These media favour the growth of a particular bacterium by inhibiting the growth of undesired bacteria and allowing growth of desirable bacteria. Examples: **MacConkey agar** and **Tellurite media** (Tellurite inhibits the growth of most of the throat organisms except diphtheria bacilli). Antibiotic may be added to a medium for inhibition.

4. INDICATOR (DIFFERENTIAL) MEDIA. An indicator is included in the medium. A particular organism causes change in the indicator, e.g. blood and neutral red . Examples: **Blood agar** and **MacConkey** agar are indicator media.

5. TRANSPORT MEDIA. These media are used when specie-men cannot be cultured soon after collection. Examples: Cary-Blair medium, Amies medium, Stuart medium.

6. STORAGE MEDIA. Media used for storing the bacteria for a long period of time. Examples: Egg saline medium, chalk cooked meat broth.

Principles of Sterilization and Disinfection

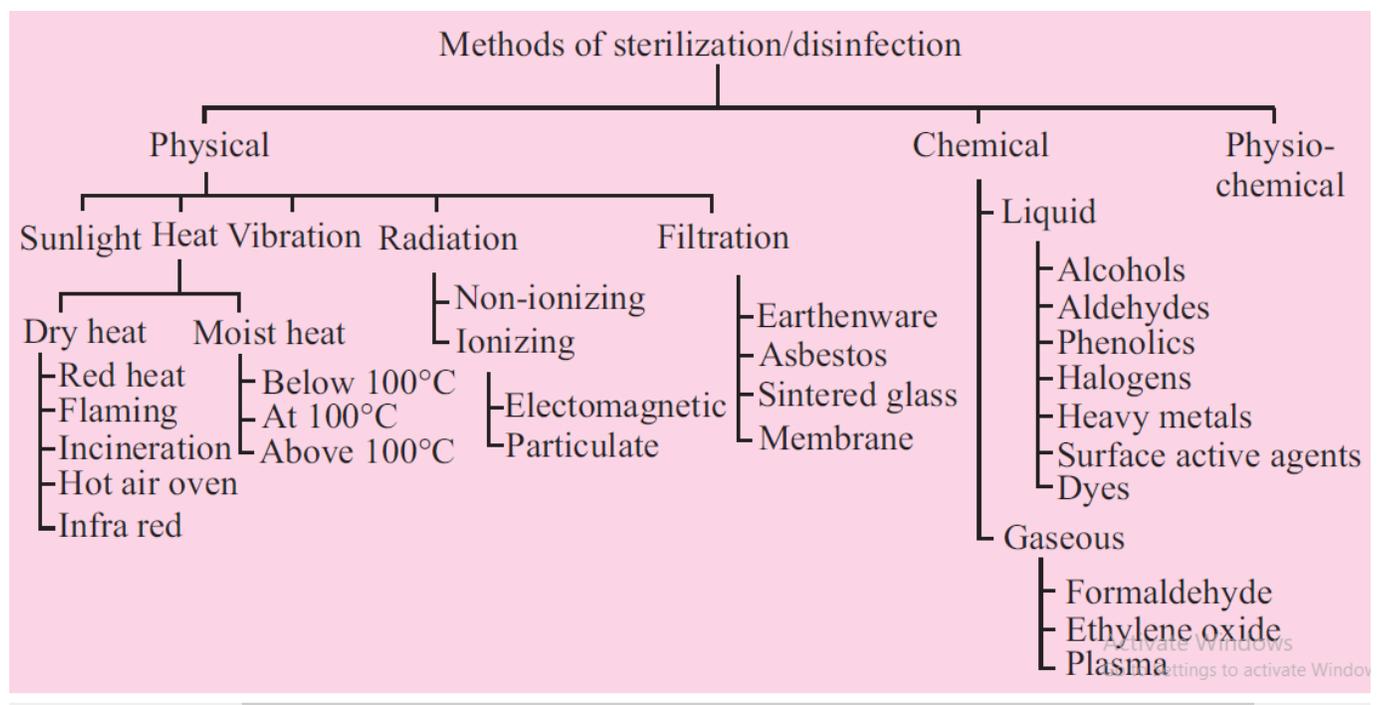
Disinfection : the destruction or removal of vegetative Pathogens but not bacterial endo spores . usually used only on inanimate objects .

Sterilization : The complete removal or destruction of all viable microorganisms .Used on inanimate objects .

Antisepsis : Chemicals applied to body surfaces to destroy or inhibit vegetative pathogens

Chemotherapy : Chemicals used internally to kill or inhibit growth of microorganisms within host tissues .

Disinfection and sterilization makes use of both physical and chemical agents. The killing of microorganisms with these agents is exponential. A measure of the efficacy of this process is the **D value** (decimal reduction time), which expresses the time required to reduce the organism count by 90%. The sterilization agents of choice are hot air (180 C, 30 minutes; 160 C,120 minutes) or saturated water vapor (121 C,15 minutes)



Methods of inoculation and isolation of pure culture

A **pure culture** theoretically contains a single bacterial species. There are a number of procedures available for the isolation of pure cultures from mixed populations. A pure culture may be isolated by the use of special media with specific chemical or physical agents that allow the enrichment or selection of one organism over another.

Simpler methods for isolation of a pure culture include: (i) **spread plating on solid agar medium with a glass spreader** and (ii) **streak plating with a loop**. The purpose of spread plating and streak plating is to **isolate** individual bacterial cells (colony-forming units) on a nutrient medium.

