



Culture Medias

Definition. *Culture media* is a gel or liquid that contains nutrients and is used to grow bacteria or microorganisms. They are also termed growth media.

Culture Media are classified into two major categories based on consistency and chemical composition.

A. On Consistency:

1. Solid Media.

- (a) Are useful in identifying bacteria based on their colonial morphology
- (b) Supports the isolation / separation of pathogenic bacteria from a mixed growth.

Solid media is used for the isolation of bacteria as pure culture. 'Agar' is normally added to the media to make it solid and is an ideal solidifying agent.

2. **Liquid Media.** It is used for profuse growth such as blood culture. However, mixed organisms cannot be separated.

Examples includes:

- a) Routine Laboratory Media
- b) Synthetic Media.

ROUTINE LABORATORY MEDIA

These are further classified into six groups;

- (i) Basal media,
- (ii) Enriched media,
- (iii) Selective
- (iv) Indicator media / Differential media
- (v) Transport media
- (vi) Storage media.

1. **BASAL MEDIA.** Basal media are used to bacteria that do not need nutritional enrichment in the media. Examples: Nutrient broth, nutrient agar and peptone water which are ideal for *Staphylococcus* and *Enterobacteriaceae* growth.

2. **ENRICHED MEDIA.** These media are enriched with additional nutrients usually by adding blood, serum or egg. Examples of enriched media include blood agar and Lowenstein-Jensen media. *Streptococci* grow in blood agar media while *mycobacteria tuberculosis* grow in Lowenstein-Jensen media.

3. **SELECTIVE MEDIA.** These media favour the growth of a particular bacterium by inhibiting the growth of undesired bacteria while allowing the growth of desirable bacteria. Examples: MacConkey agar, Lowenstein-Jensen media, tellurite media (Tellurite inhibits the growth of most of the throat organisms except *diphtheria bacilli*). Antibiotic may be added to the 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, neutral red, tellurite. Examples: Blood agar and MacConkey agar are indicator media.

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

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

COMMON MEDIA IN ROUTINE USE

Nutrient Broth.

Uses:

- (1) As a basal media for the preparation of other media,
- (2) To study soluble products of bacteria.

Nutrient Agar.

It is solid media at 37°C with 2.5% agar added in nutrient broth.

Peptone Water.

Peptone is used as a base for sugar media and to test indole formation.

Blood Agar. Most commonly used medium with 5- 10% defibrinated sheep or horse blood added. Blood acts as an enrichment material and also as an indicator. Some bacteria when grown in blood agar produce haemolysis around their colonies while others do not produce haemolysis.

MacConkey Agar. Most commonly used for enterobacteriaceae. It is both a selective and indicator medium:

- (1) Selective because bile salt included does not inhibit the growth of enterobacteriaceae but inhibits growth of many other bacteria.
- (2) Indicator medium because colonies of bacteria ferment lactose to produce a pink colour due to production of acid. Acid turns the indicator neutral red to pink. These bacteria are called 'lactose fermenter', e.g. *Escherichia coli*. Colorless colony indicates that lactose is not fermented, i.e. the bacterium is non-lactose fermenter. Examples are *Salmonella*, *Shigella*, *Vibrio*.

Mueller Hinton Agar. The media is useful in disc diffusion sensitivity tests for antimicrobial drugs testing.

Hiss's Serum Water Medium. This medium is used to study the fermentation reactions of bacteria which cannot grow in peptone water sugar media, e.g. pneumococcus, Neisseria, Corynebacterium.

Lowenstein-Jensen Medium. It is used to culture tubercle bacilli.