University of Salahaddin
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Seed Borne Pathogen

Second Lecture /3rd. stage

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Culture media

Contents:

Culture media

Classification of culture media

Preparation of culture media

A culture medium: is a solid or liquid preparation containing all the nutrients required by microorganisms for growth.

Components of culture media:

- **Nutrients:** proteins, peptides, amino acids
- **Essential metals and minerals:** calcium, magnesium, iron, phosphates and sulphates.
- **Indicators for pH change:** phenol red, bromo-cresol purple etc.
- **Selective agents:** bile salts, antibiotics and dyes.

Pure culture: contains only one species or strain

A pure culture of *Pseudomonas fluorescens*

Contaminated culture : contains unwanted species of organisms

Isolation: The separation of a pathogen from its host and its culture on a nutrient medium.

Colony: visible growth of microbes on the surface of a solid medium.

Media classification

Based on physical state

Based on composition

Based on function

According to physical state

1. Liquid medium: is a type of media. used for most of quantitative studies such as nutritional and metabolic studies on fungi.

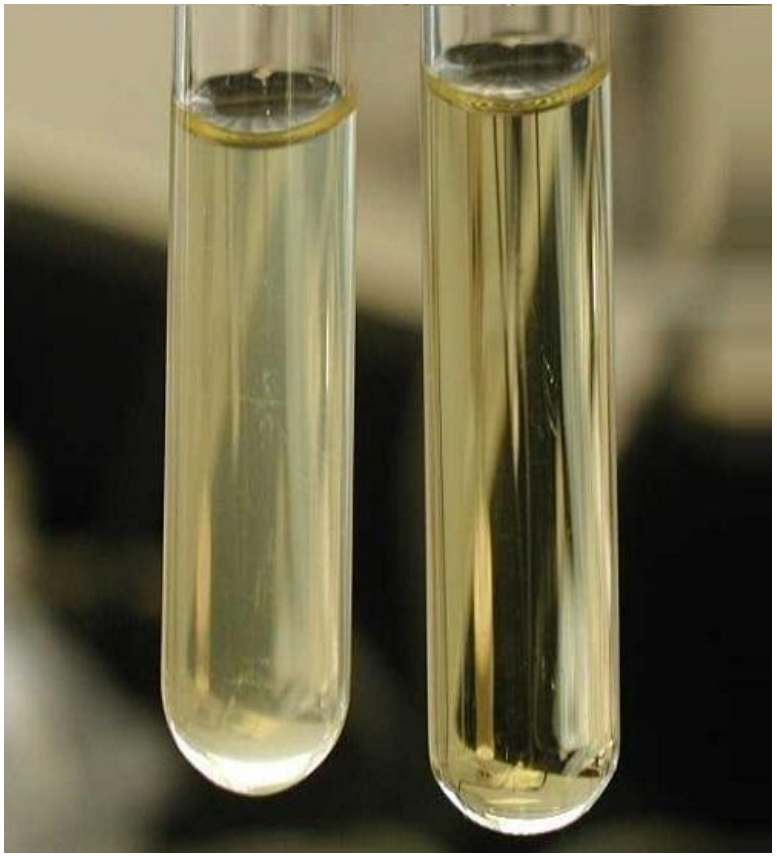
Without adding solidifying agent (agar).

medium is called *broth.*

Turbidity = growth of microorganism

Clear = no growth

eg. Nutrient broth.



Semi Solid Media

This type of medium contain a small amount of agar. Also it is useful in demonstrating bacterial motility and separating motile from non motile strains.

3. Solid medium

The medium can be solidify by adding agar . It is used for isolating microbes and to determine characteristics of colonies.

Media classification

According to composition media can be classified into:

1- natural media

2- Semi-synthetic

3- Synthetic

1. Natural media:

A natural medium comprises entirely complex natural products of unknown composition. The raw materials of a natural medium may be of plant or animal origin, and some of the common ingredients employed for this purpose include extracts of plant and animal tissues, e.g. fruits, vegetables, egg, milk, blood, yeast, etc.

2. Semi-synthetic

These media are so designed that some of their constituents are of known chemical composition, while others are derived from some natural sources with unknown composition.

3. Synthetic medium

is chemically defined media and is produced from pure chemical substances.

This medium have a known concentration of ingredients, like sugar (glucose or glycerol) and nitrogen source (such as ammonium salt or nitrate). It is generally used in scientific research, and an example is Czapek Dox

Classification according to function

Basic media

Selective media

Enriched media

Differential media

Assay media

Transporting media

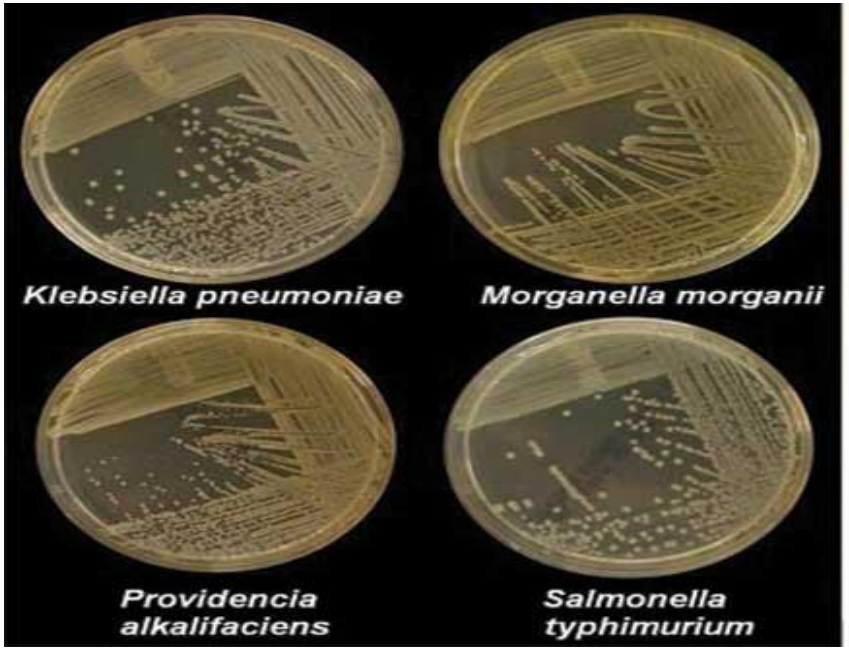
Classification according to function

1- **Basic media:** This type of media contains only the basic requirement for the growth of microorganisms like sources of carbon, nitrogen, energy.

This media used for laboratory diagnostic and preservation procedure.

It support to grow non fastidious bacteria (*Enterobacter aerogenes, Pseudomonas aerogenosa, Salmonella sp.*)

Eg. Nutrient agar, nutrient broth.



According to function media classified into:

2- Selective media:

substances (bile salts, antibiotics, dyes) added to a media to favor the growth of wanted microorganism and Inhibit another.

3- enriched media: substances such as blood, egg are added to basal media used to support the growth of the nutritionally fastideous microbes (need extra nutrients to grow)

e.g chocolate agar and blood agar.

4- Differential media or indicator media

Differential media – Also known as indicator media, are used to distinguish one microorganism type from another growing on the same media.

This type of media uses the biochemical characteristics of a microorganism growing in the presence of specific nutrients or indicators (neutral red, phenol red, or methylene blue) added to the medium to visibly indicate the defining characteristics of a microorganism.

e.g. MacConkey's agar

5- Assay media

This type of media is used for the assay of vitamins, amino acids, antibiotics etc.

6- Transport media

Used for carrying microbes from one place to another place.

Transport media does not support the growth or multiplication of microbes because it lacks nutrients like carbons, nitrogen or any other growth factors, it only helps to maintain the original state of the medium, it only contains buffers and salts.

Potato Dextrose Agar:

is a common media for growth of fungi.

PREPARING FROM COMMERCIAL POWDER

Add 39 g of commercialized powder to 1 liter of distilled water.

Boil while mixing to dissolve completely.

Sterilize media by autoclaving at 121ºC for 15 minutes.

Aseptically dispense into sterile Petri dishes.

nutrient Agar:

is a non selective culture medium commonly used for the culture of non-fastidious microorganisms.

Add 28 g of nutrient agar powder to 1 liter of distilled water in a flask.

The suspension is then heated to dissolve the medium completely.

The dissolved medium is then autoclaved at 15 lbs pressure (121°C) for 15 minutes.

After autoclaving the flask is cooled .

The media is then poured into sterile Petri plates under sterile conditions.