CULTURE MEDIA

Dr. C.SWAMINATHAN
Assistant Professor
PG and Research Department of Microbiology
St. Joseph's College of Arts and Science (Autonomous)
Cuddalore – 607 001
Tamil Nadu, India

Culture Media

- A substance used to provide nutrients for the growth and multiplication of microorganisms.

Types of Culture Media

A) Based on their consistency

- Solid media
- Semisolid media
- Liquid media

B) Based on the constituents/Ingredients

- Simple medium
- Complex medium
- Synthetic or defined medium
- Special medium
  - Enriched medium
  - Enrichment medium
  - Selective medium
  - Indicator medium
  - Differential medium
  - Sugar medium
  - Transport medium

C) Based on oxygen requirement

- Aerobic medium
- Anaerobic medium

A) Based on their consistency

Solid Media

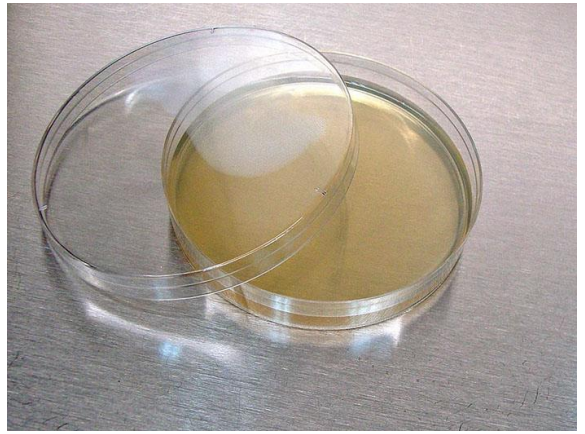
- Solid media contains 1-2% agar.
- Provide isolated colonies that can be quantified and identified.

e.g. Nutrient agar, Blood agar

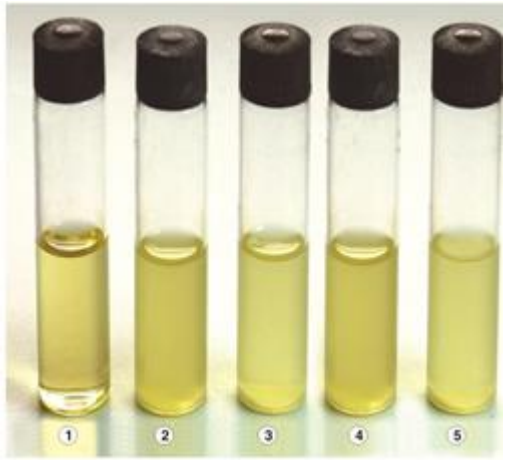
Liquid Media

- Liquid media are referred to as ‘broth’.
- Provide greater sensitivity for the isolation of small numbers of microorganisms.

e.g. Nutrient broth



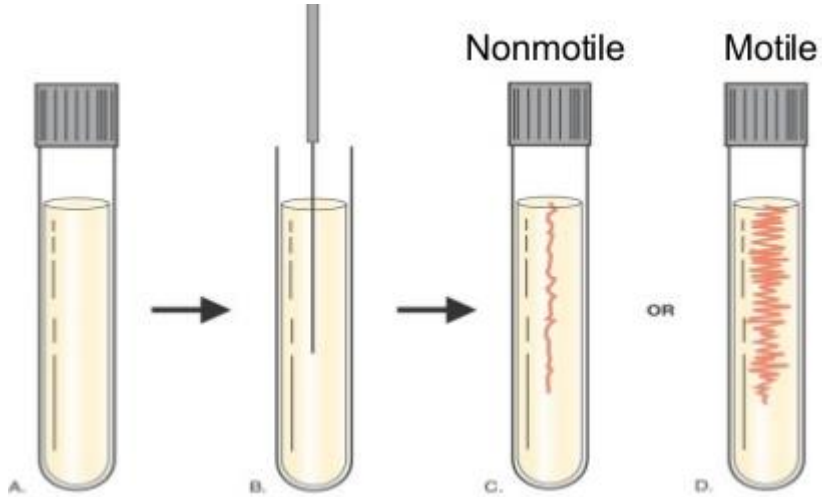
Solid medium



Liquid media

Semisolid Medium (Sloppy agar)

- Contains 0.2 - 0.5% agar.
- Used to determine the motility of microorganisms.



Semisolid media for motility determination

B) Based on the constituents/Ingredients

Simple Media/ Basal Media

- Basal media are those that may be used for growth of bacteria that do not need special nutrients.

1) Peptone water

2) Nutrient broth

3) Nutrient agar
   - Nutrient broth + 2% agar
   - If its concentration is raised to 6%, it is called ‘hard agar’

Bacterial growth on nutrient agar

Complex Media

- Complex media have complex ingredients, which consist of a mixture of many chemicals in unknown proportions.
- This is an undefined medium.
- e.g. MacConkey agar
- e.g. Chocolate agar

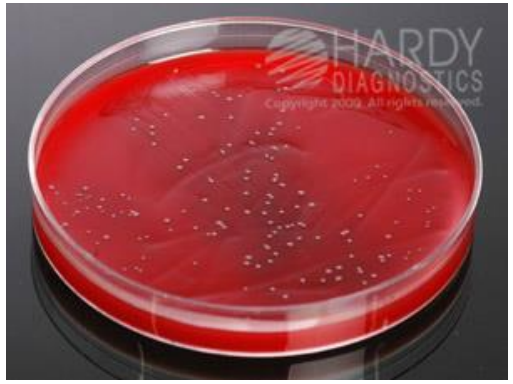
Synthetic or Defined Media

- Synthetic media contains known quantities of all ingredients.
- e.g. Dubos' medium with Tween 80

Special Media

Enriched Medium

- Substances like blood, serum or egg are added to the basal medium.
- Used to grow bacteria that are exacting in their nutritional needs.
- e.g. Blood agar – for isolation of *Streptococcus*
- e.g. Chocolate agar – for isolation of *Neisseria* and *Haemophilus*



***Streptococcus* on blood agar**

***Haemophilus* on chocolate agar**

Enrichment Medium

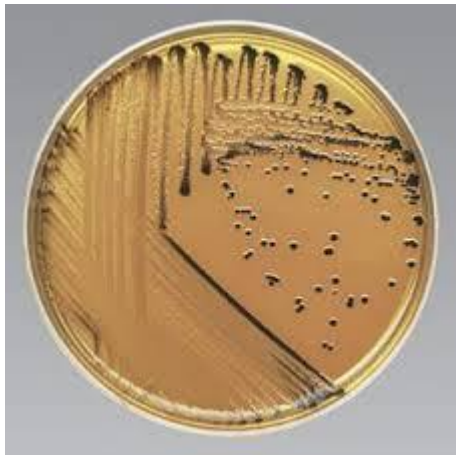
- It is a liquid medium.
- Media is incorporated with inhibitory substances to suppress the unwanted organism.
- e.g. Selenite F broth – for isolation of *Salmonella* and *Shigella*
- e.g. Alkaline peptone water – for *Vibrio cholerae*

Selective Medium

- Inhibitory substance is added to a solid medium.
- Isolation of a particular species of bacteria from a mixed inoculum is possible by the help of a selective medium.

Salmonella Shigella (SS) agar

- For *Salmonella* and *Shigella*



Salmonella on SS agar

Thiosulfate-Citrate-Bile salts-Sucrose (TCBS) agar

- For *Vibrio cholerae*

Mannitol salt agar (MSA)

- For *Staphylococcus aureus*

Eosin Methylene Blue (EMB) agar

- For *Escherichia coli*

***Vibrio cholerae* on TCBS agar**

***Staphylococcus aureus* on MSA**

***Escherichia coli* on EMB agar**

Indicator Medium

- These media contains an indicator which changes its colour when a bacterium grows in them.

Wilson and Blair medium

- For *Salmonella*

Mc Leod's medium

- For Diphtheria bacillus

***Salmonella* on Wilson and Blair medium**

Differential Medium

- The differential medium is one, which enables one to differentiate two types of organisms by their characteristic growth.

MacConkey's medium

- Lactose fermenters – pink colonies
- Non-lactose fermenters – colourless colonies

Lactose fermenting organism on MacConkey agar

Blood agar

- Alpha hemolysis – partial hemolysis
- Beta hemolysis – complete hemolysis
- Gamma – No hemolysis

Blood agar plate showing alpha, beta and gamma haemolysis

Transport Medium

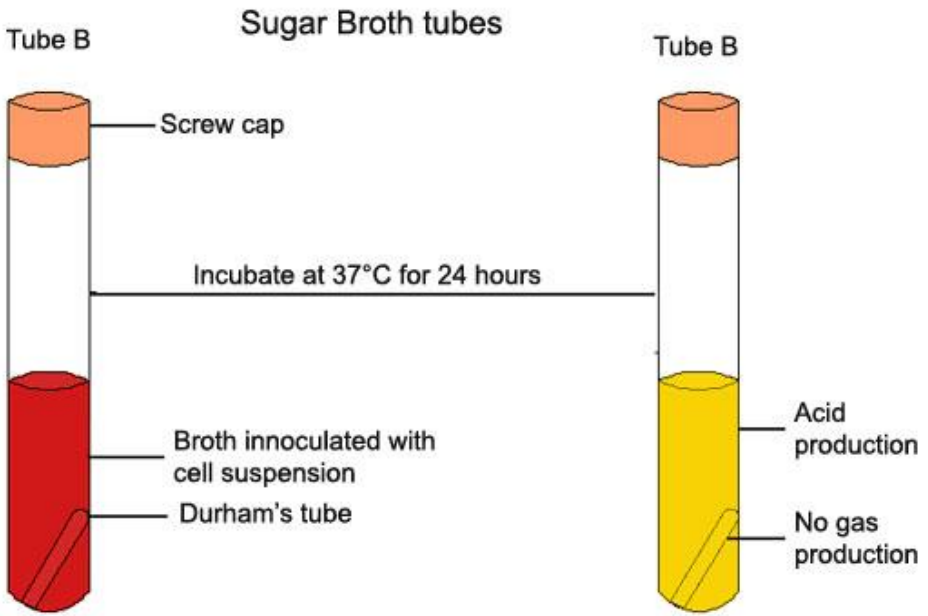
- Transport media are used for transporting clinical specimens.
- e.g. Stuart's transport medium – for urethral discharge (Gonococci)
- e.g. Glycerol saline transport medium – for stool (dysentery bacilli)

Storage Medium

- Storage media are used for storing the bacteria for a long period of time.
- e.g. Dorset egg medium

Sugar Medium

- Sugar media consists of 1% sugar in peptone water along with an appropriate indicator.
- Durham’s tube is kept inverted in the sugar tube to detect gas production.



In the above image test tube B is innoculated with a cell suspension and incubated at 37° C for 24 hours and after incubation the colour of test tube was changed from red to yellow due to acid production and their no gas formation.

c) Based on oxygen requirement

Anaerobic Medium

- Used to grow anaerobic microorganisms
- e.g. Robertson's cooked meat medium (RCM)
- e.g. Thioglycollate broth

RCM

COLOUR PHOTOS

Courtesy:

www.hardydiagnostics.com

www.oxoid.com

www.himedialabs.com

www.microbiologyinpictures.com

www.microbelibrary.org