

Culture Media

Part 2



Culture media can be classified according to their:

A) Physical states (Forms of media):

- Solid media.
- Semi-solid media.
- Liquid media.

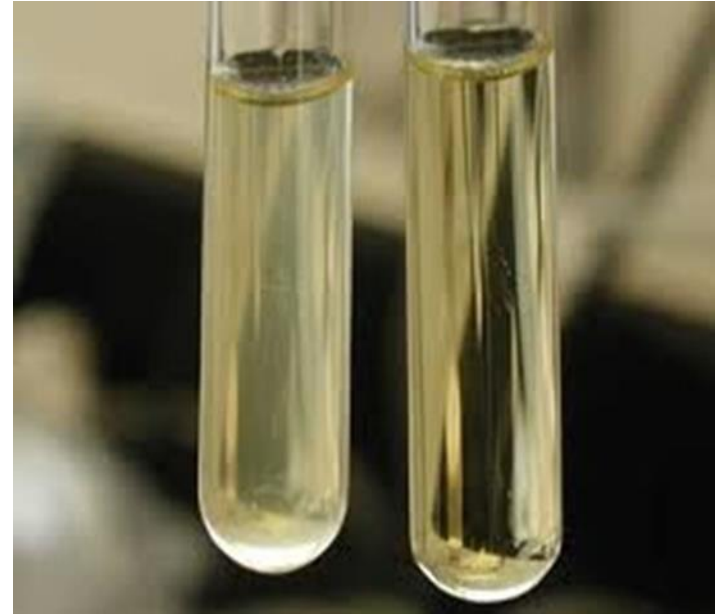
B) Function:

- Basic media
- Enriched media
- Enrichment media
- Selective media
- Differential media
- Transport media

Forms of Culture Media

1. Liquid form:

- Called: broth.
- Without agar (solidifying agent).
- Used to grow bacteria in large quantity.
- Growth of bacteria-----> **turbidity**
- No growth -----> **clear**



2. Solid form:

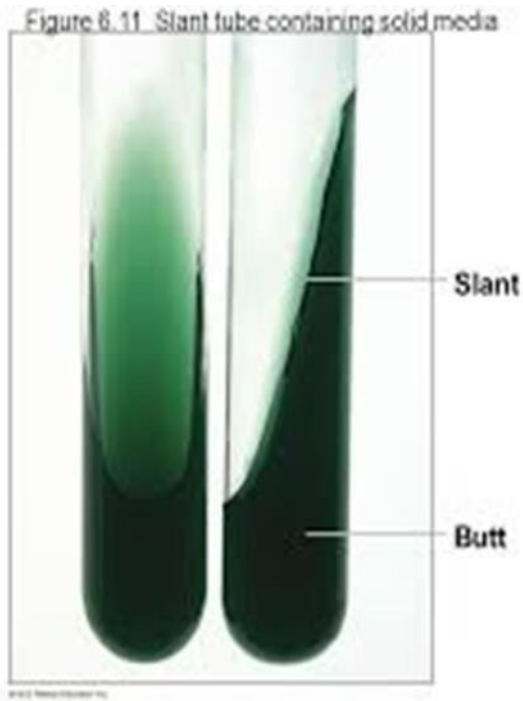
- With agar (1-2% agar).

- Solid media can be:
 - **Slant:** a tube containing solid media that was left to solidify at an angle. Used to keep the bacteria for long period of time (3 months)
 - **Deep agar:** agar solidified at bottom of tube. Used to keep the bacteria for long time (6 months or more).
 - **Plate:** used mostly to culture organisms, and to get pure culture of bacteria (isolated colony).

3. Semi-solid agar:

- Contains less agar than solid media (0.5% agar).
- Used as transport media, and for motility and biochemical tests.

Slant



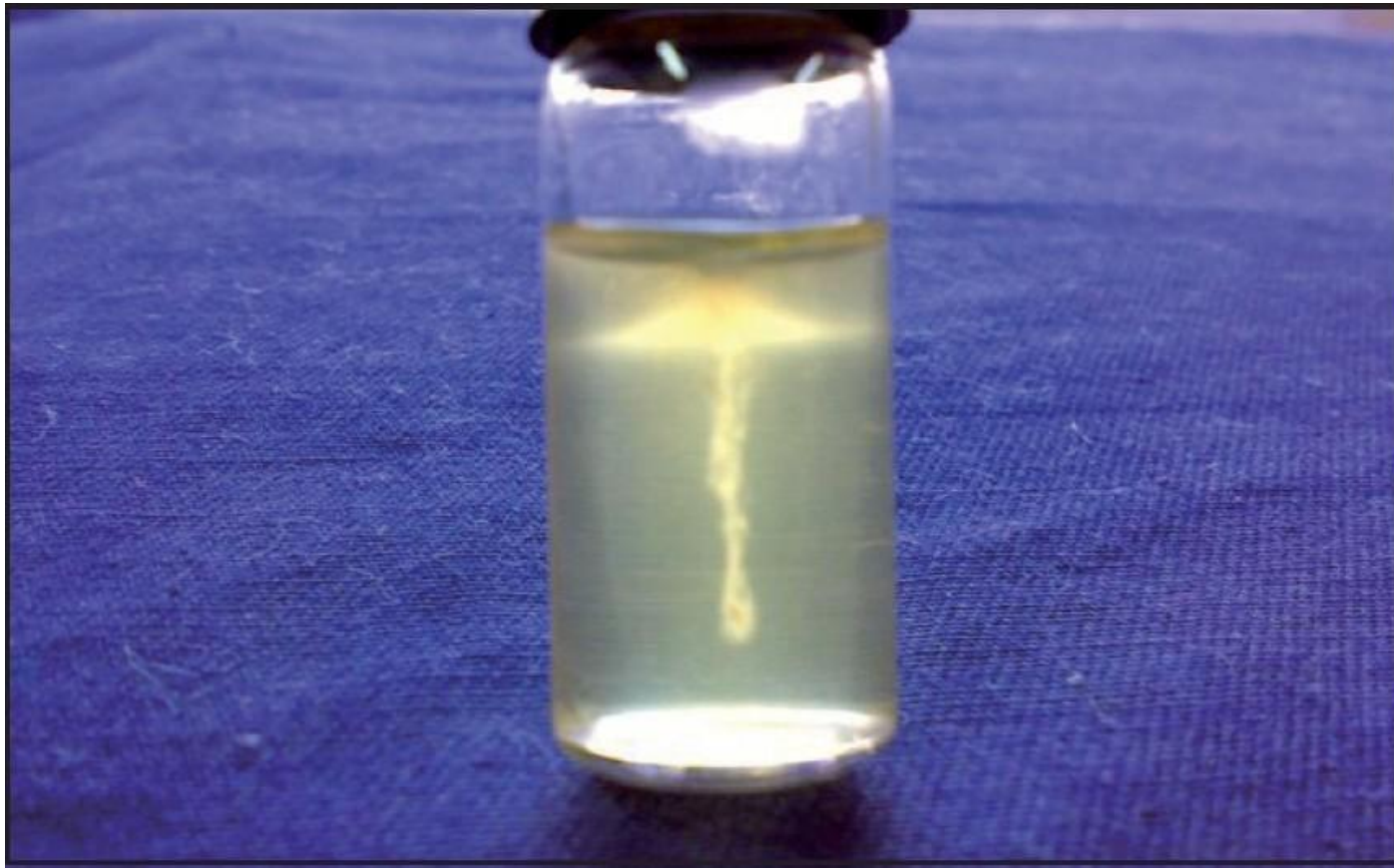
Deep



Agar plate



Motility in semi-solid media



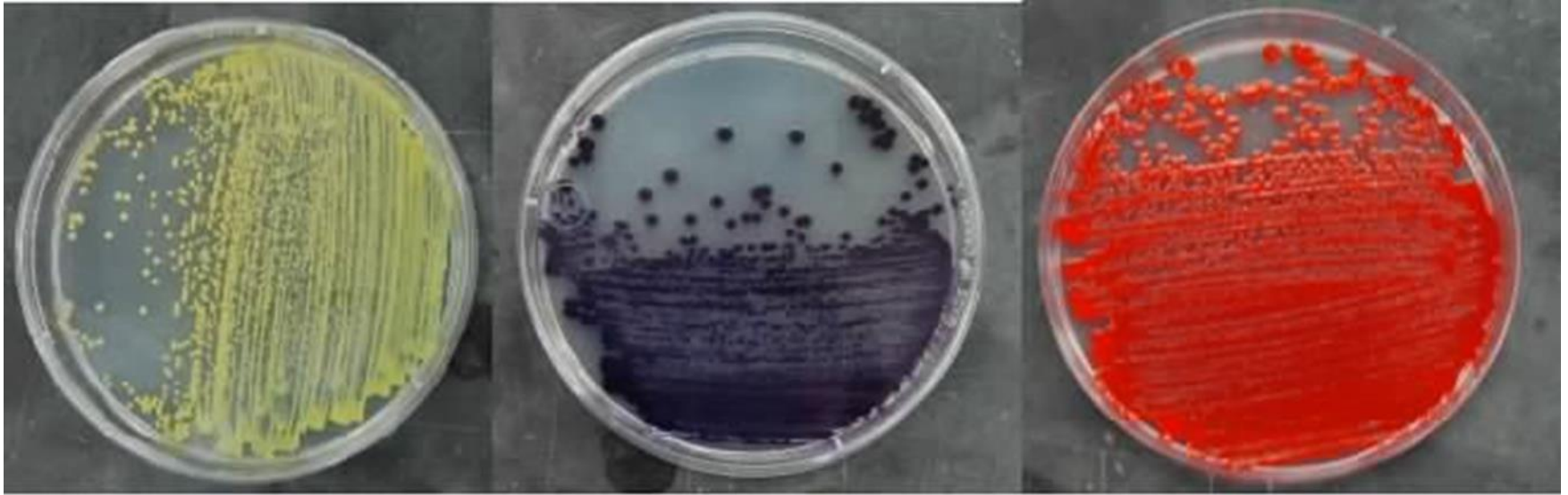
Types of Culture Media According to their Functions

1. Basal media:

- It's simple media, such as: nutrient agar (NA) and nutrient broth.
 - It allow the growth of non fastidious (do not have special nutritional requirements) or non-pathogenic bacteria.
 - Used in preparation of enriched media and to maintain stock culture of bacteria.
- For the culture: notice the shape, margin, elevation, color, size, smell of organism.



Notice pigment production by organism



*Micrococcus
luteus*

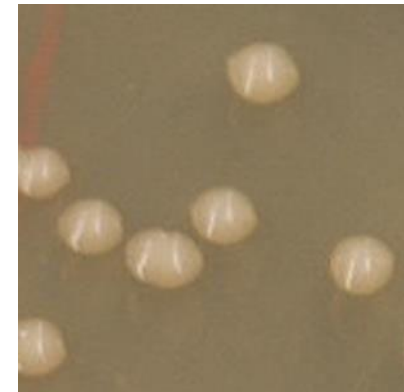
*Chromobacter
violaceum*

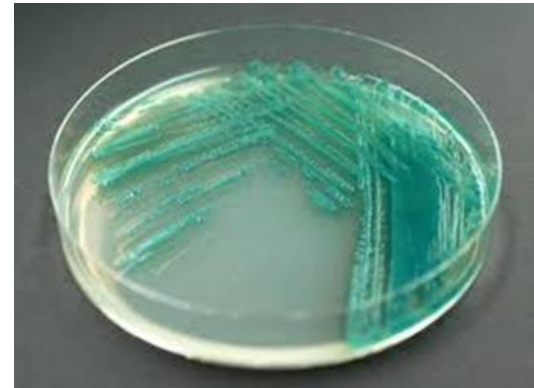
*Serratia
marcescens*

Klebsiella spp.

Bacillus

Pseudomonas





2. Enriched media:

- It is basal media has been enriched by adding blood, serum or protein.
- It allows the growth of fastidious and pathogenic bacteria.
- Ex: Blood agar (BA),



Chocolate agar.

3. Selective media:

- It contains inhibiting agents that inhibit some organisms and allows others to grow.
- Inhibiting agents: bile salt, dyes, antibiotics.
- Examples:

A) Macconkey agar (Mac):

- Inhibiting agent>> bile salt & crystal violet.
- It allow the growth of gram-negative bacteria and inhibit the growth of gram-positive bacteria.

B) Eosin Methylene Blue agar(EMB):

- Inhibiting agent>> methylene blue

- It allow the growth of gram-negative bacteria and inhibit the growth of gram-positive bacteria.

Mac

EMB



4. Differential media:

- Contain indicator which differentiate between two types of bacteria.

- Examples: **A) Mac:**
 - Sugar **Lactose**.
 - Indicator **Neutral red**.
 - Used to differentiate between lactose fermenting (LF) & Non-lactose fermenting (NLF) bacteria.

LF>> **pink colonies**

NLF>> **yellow colonies**

Mac



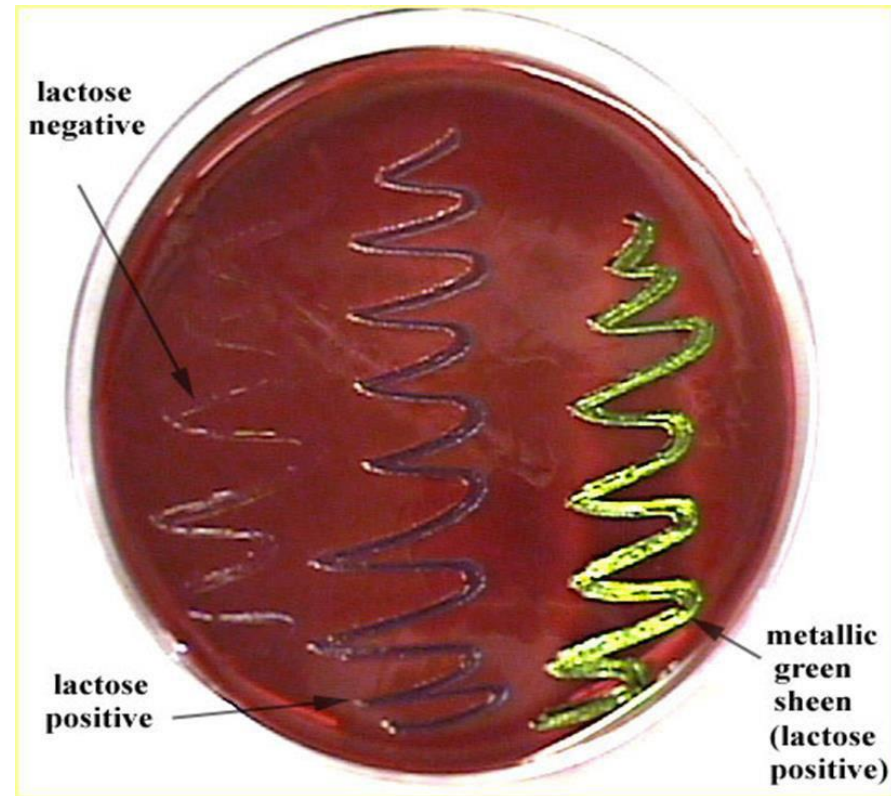
B) EMB:

- Sugar **Lactose**.

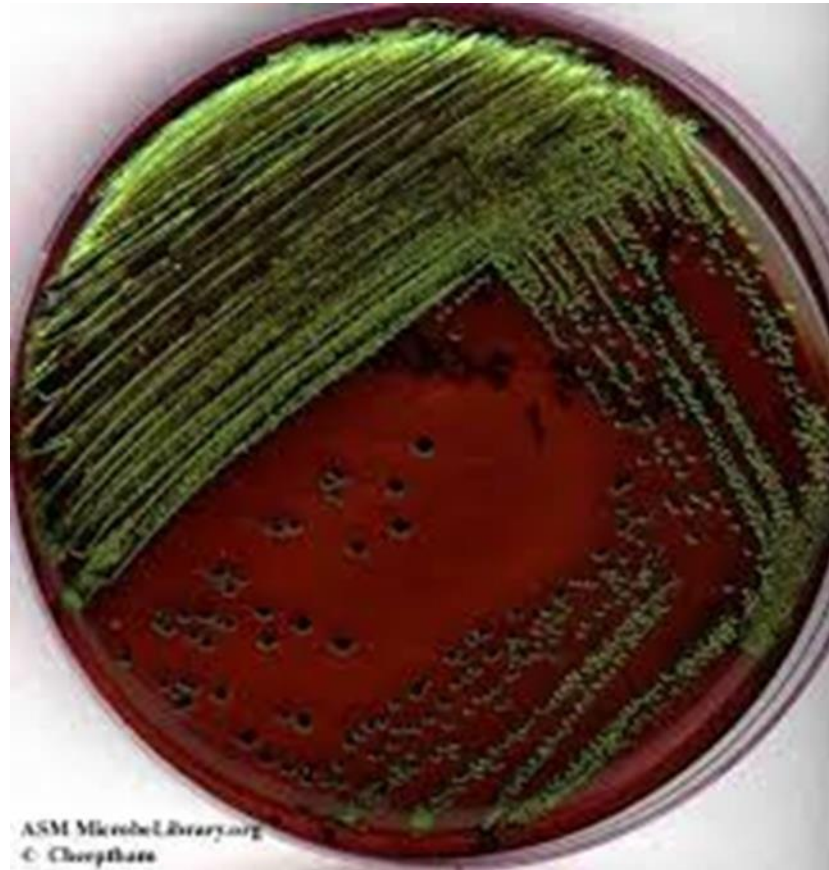
- Indicator **Eosin and Methylene blue.**
- Used to differentiate between LF & NLF bacteria.

LF>> **pink colonies (dark purple)** NLF>> **colorless colonies**

- *E.coli*: LF produce **green metallic sheen colonies**



E. coli on EMB



ASM MicroLibrary.org
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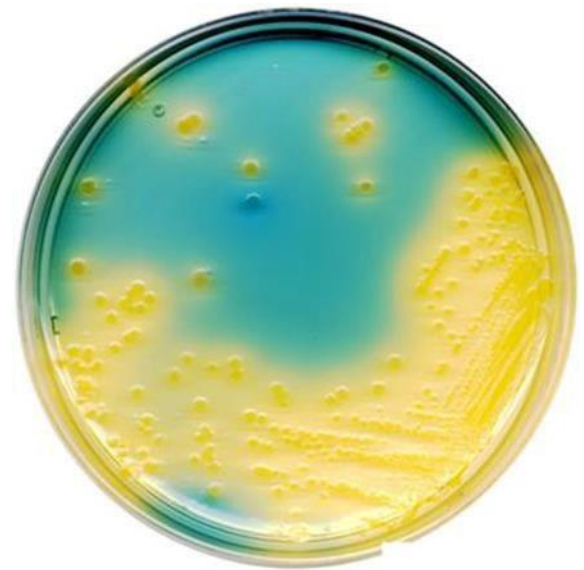
C) Cystine Lactose Electrolyte Deficient (CLED):

- Sugar **Lactose**
- Indicator **Bromothymol Blue**
- Used to differentiate between LF and NLF bacteria.

LF>> **yellow colonies**

NLF>> **colorless colonies**

D) Blood Agar:



- Used to differentiate between different types of hemolysis.

- Types of hemolysis:

α Hemolysis

β Hemolysis γ

Hemolysis



Types of Hemolysis

α hemolysis: •

Incomplete hemolysis

- greenish color around colonies



β hemolysis: •

Complete hemolysis

- Clear area around colonies.

γ Hemolysis: No hemolysis



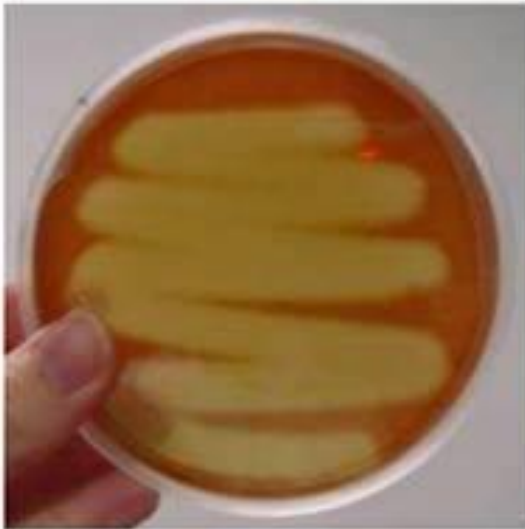
Blood Agar:

Shows three types of hemolysis

α Hemolysis

β Hemolysis

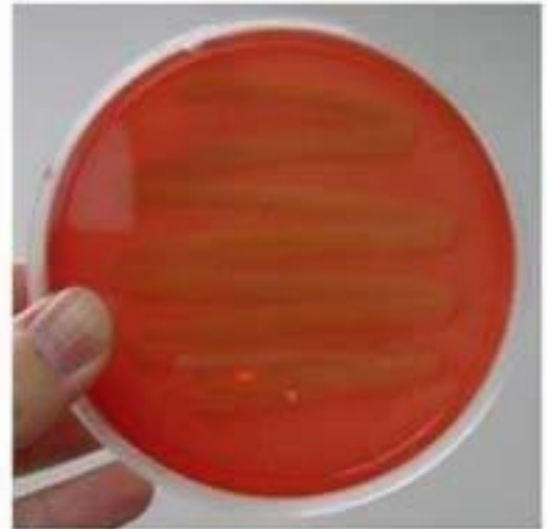
γ Hemolysis



Beta Hemolysis



Alpha Hemolysis



Gamma Hemolysis

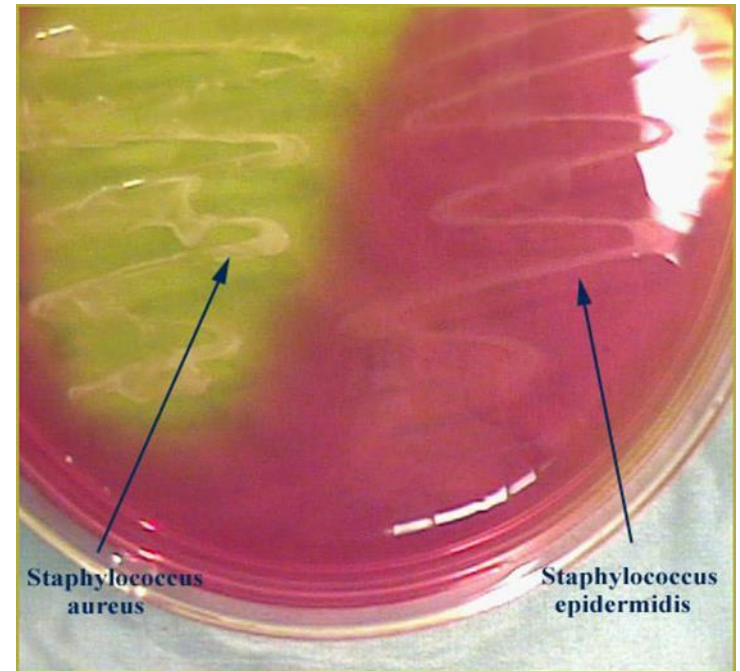
5. Selective and Differential

media: • Example:

A) Mac B) EMB

C) Mannitol Salt Agar(MSA)

- Inhibiting agent: high salt concentration 7.5%
- Only organisms that can tolerate high salt conc. can grow on it.
- Sugar **Mannitol** Indicator **Phenol red**
- The organism that ferments mannitol give **yellow color** colonies, if organism does not ferment mannitol no change in color (**colorless**)



Swarming of Proteus

- Swarming appear as spreading rose on BA and NA plates.
- CLED inhibit swarming.

