Culture Media

Part 2

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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

Agar plate

Deep

Figure 6.11 Slant tube containing solid media
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 allow 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.
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
B) EMB:

- Sugar **Lactose**.
- Indicator **Eosin** and **Methylen 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
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:
  - $\alpha$ Hemolysis
  - $\beta$ Hemolysis
  - $\gamma$ 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

[Images of Beta, Alpha, and 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.