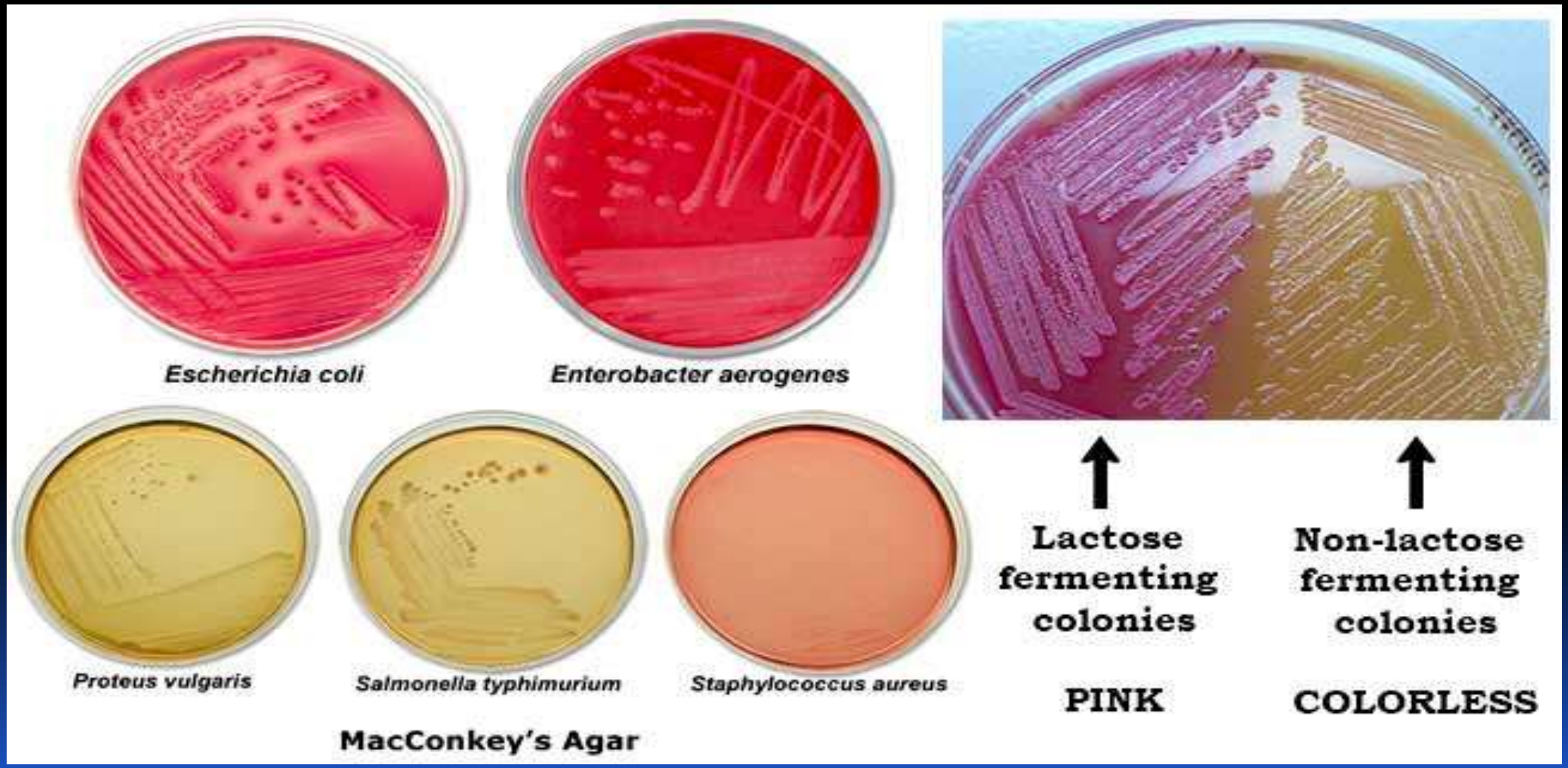
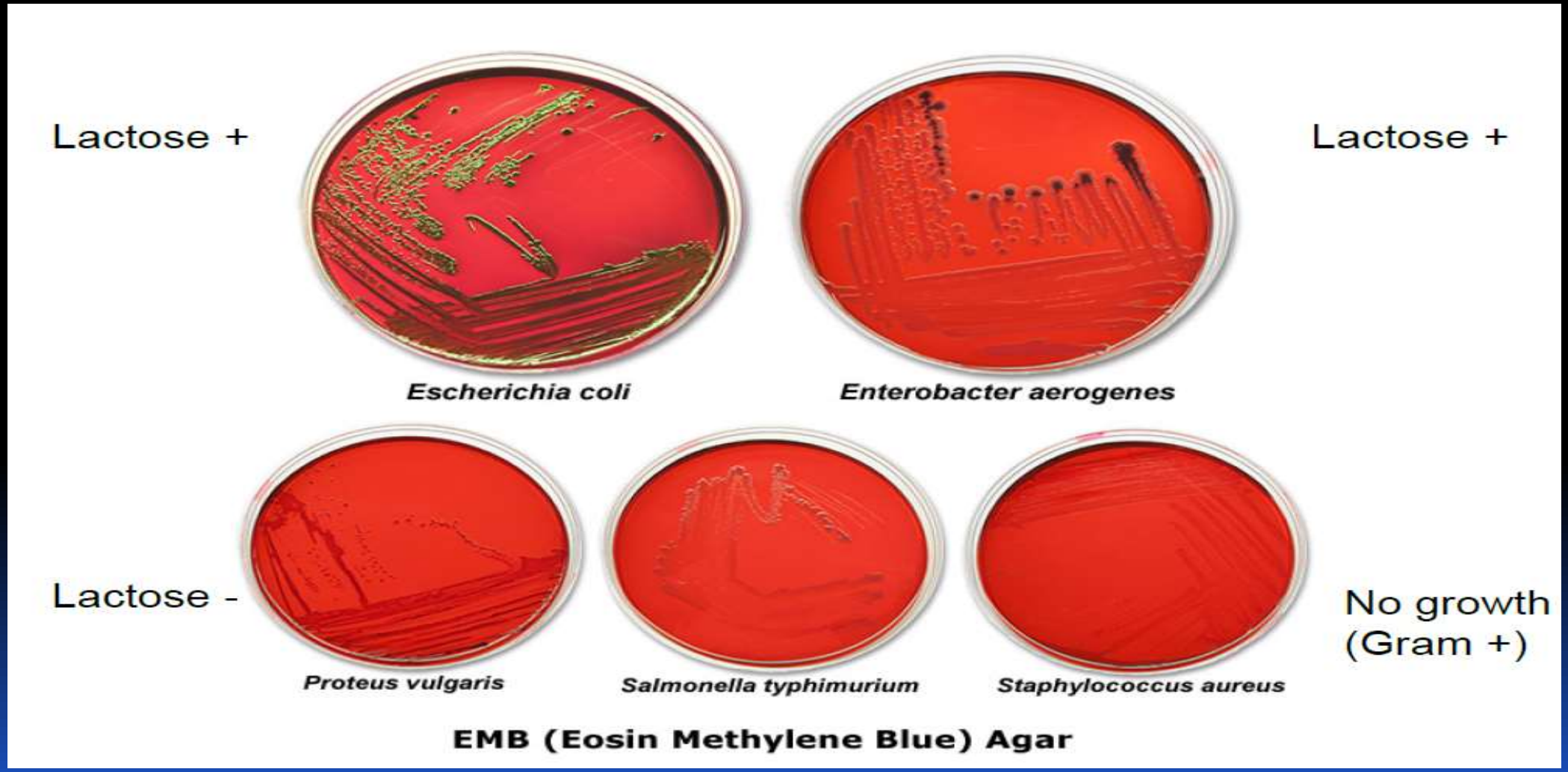
EXPLORE THE WORLD OF MICROBES AND SUPERBUGS

Dr. Pranita Gulhane
Department of Microbiology
S.S.E.S. Amravati's Science College, Congress Nagar, Nagpur

1. MacConkey agar media

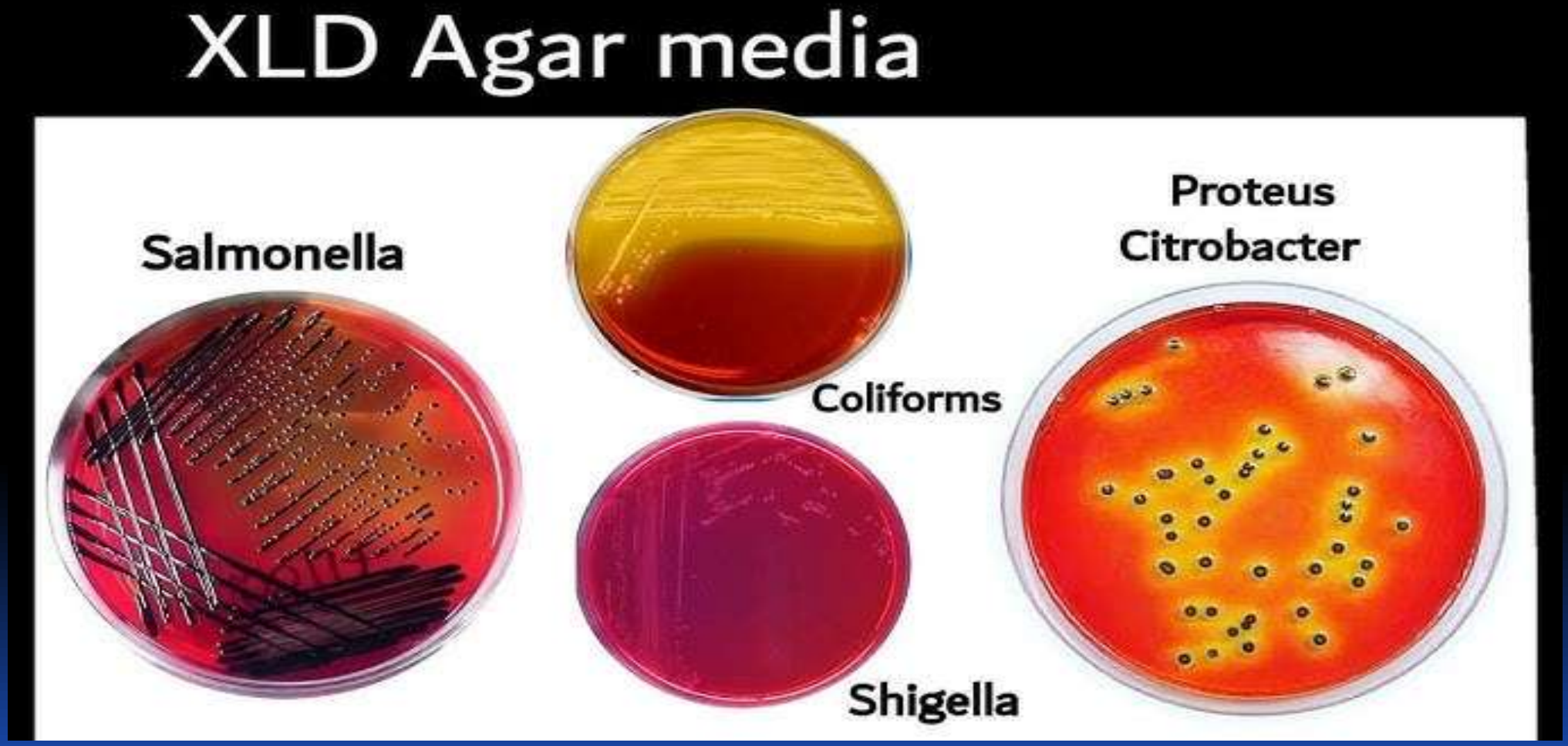


2. Eosin methylene blue agar media



3.Bismuth sulphite agar media

4. XlD AGAR

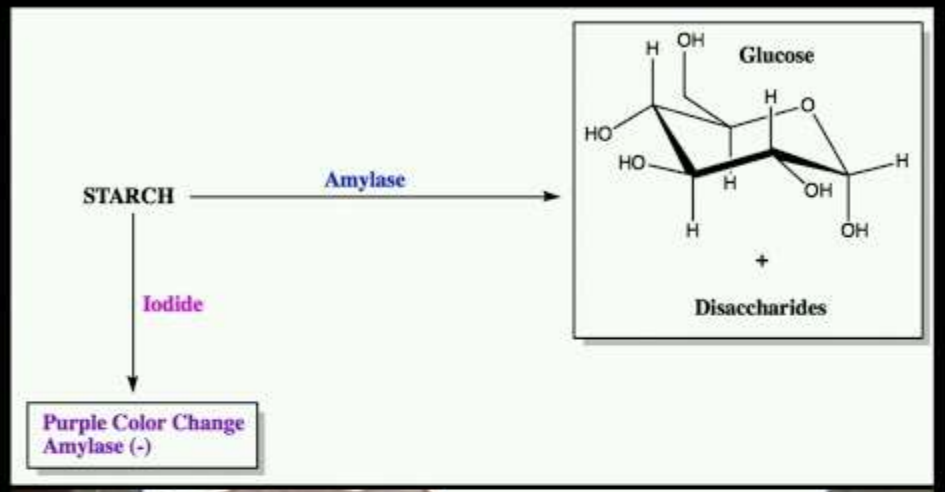

XLD Agar media
Salmonella
Coliforms
Proteus
Citrobacter
Shigella

5. Cysteine Lactose Electrolyte Deficient AGAR

6. MRS MEDIA

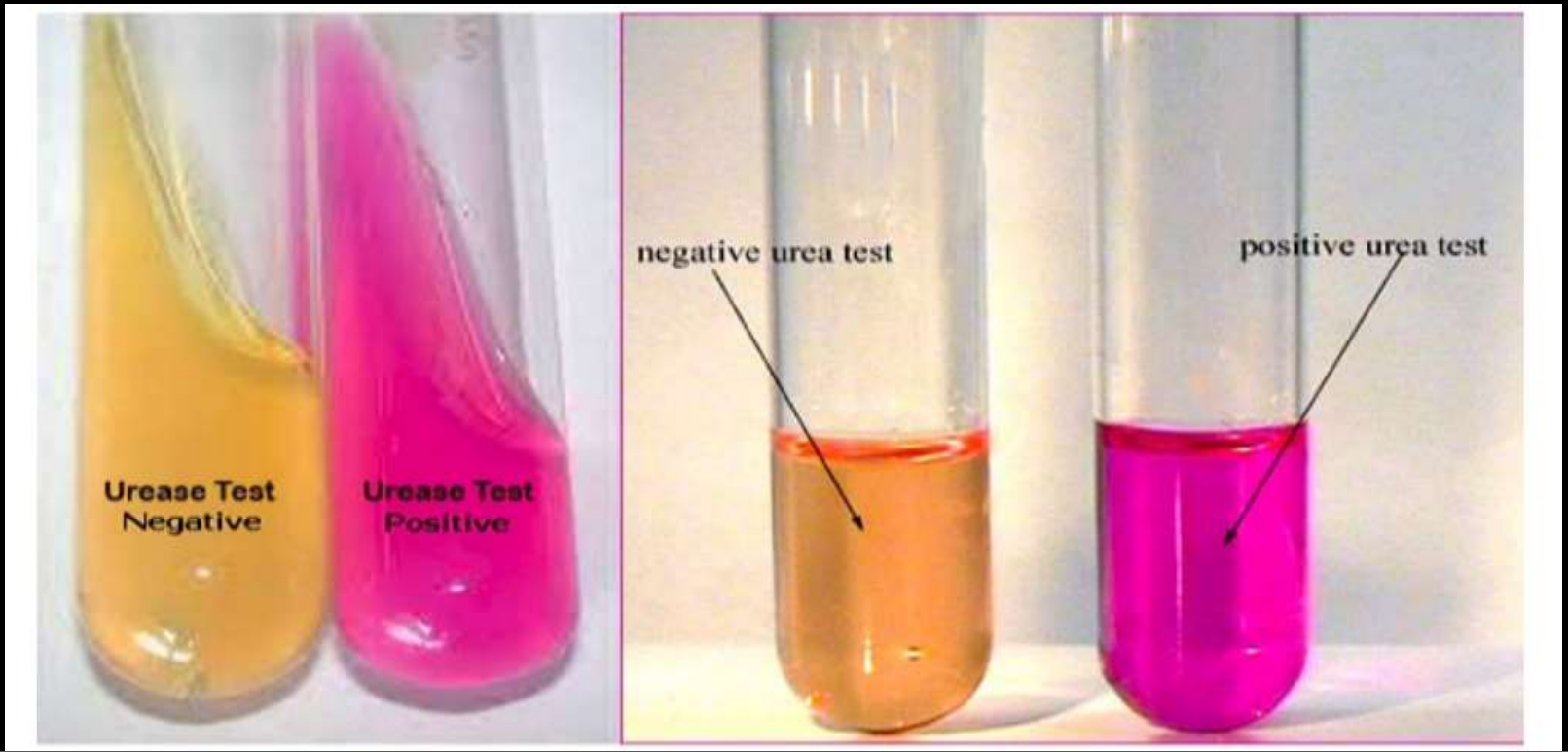

Round, creamy white colonies of *Lactobacillus* sps.
A
Lactobacillus sps. Showing streptomycin resistance
B

Starch Hydrolysis Test



- Some bacteria can perform **starch (amylose) hydrolysis** via an enzyme called **amylase**, which you may have seen in A&P.
- Amylase breaks starch down into **glucose (monosaccharides) and disaccharides** for catabolism in bacteria.
- If bacteria do not have amylase, starch is not broken down in plate, and starch therefore remains.
- **Iodide** causes remaining starch to turn **dark purple**.
  - **Purple** = Amylase (-)
  - Clearing = Amylase (+)

Urease Test



Principle of Urease Test

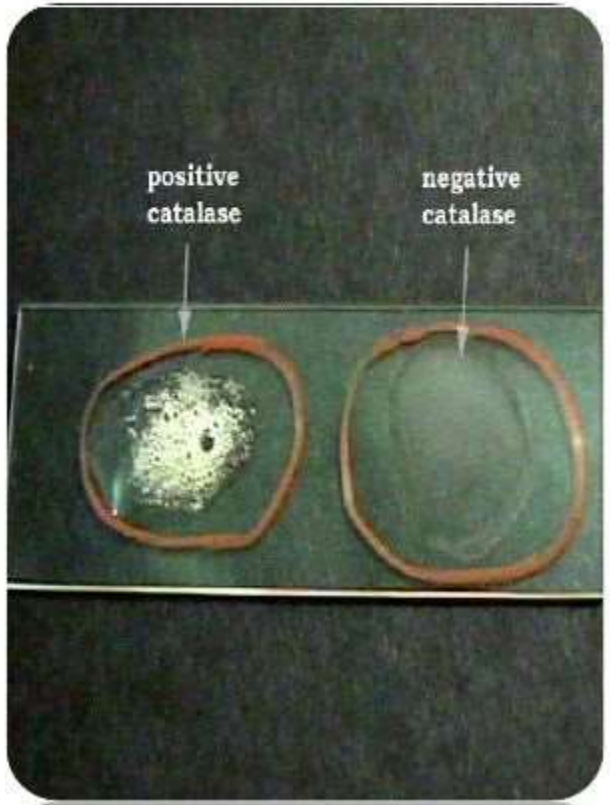
Urea is the product of decarboxylation of amino acids. Hydrolysis of urea produces ammonia and CO_2. The formation of ammonia alkalinizes the medium, and the pH shift is detected by the color change of phenol red from light orange at pH 6.8 to magenta (pink) at pH 8.1. Rapid urease-positive organisms turn the entire medium pink within 24 hours. Weakly positive organisms may take several days, and negative organisms produce no color change or yellow because of acid production.

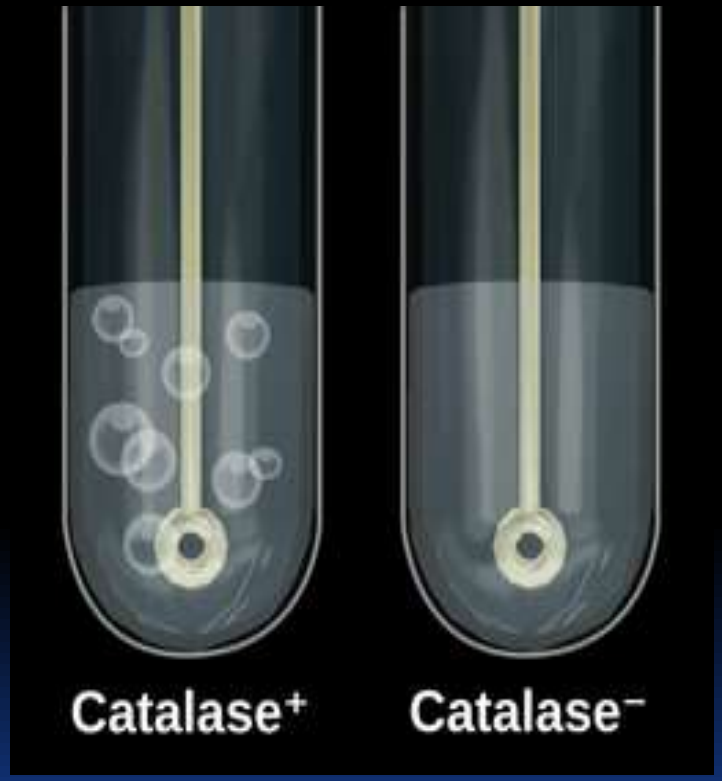
Catalase test .

This test is used to identify organisms that produce the enzyme, catalase. This enzyme detoxifies hydrogen peroxide by breaking it down into water and oxygen gas.

$$2H_2O_2 \xrightarrow{\text{Catalase}} 2H_2O + O_2$$

The bubbles resulting from production of oxygen gas clearly indicate a catalase positive result





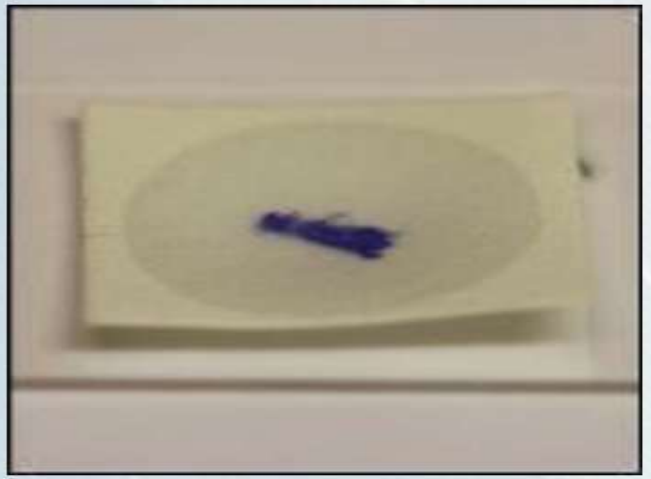
Oxidase Test

The oxidase test identifies microorganisms that produce the enzyme cytochrome oxidase. The test is spot method based on color change and is useful in the initial characterization of Gram negative microorganisms. It is used to differentiate oxidase positive microorganisms such as *Aeromonas* spp., *Pseudomonas* spp., and *Haemophilus* spp. from the oxidase negative *Enterobacteriaceae*.

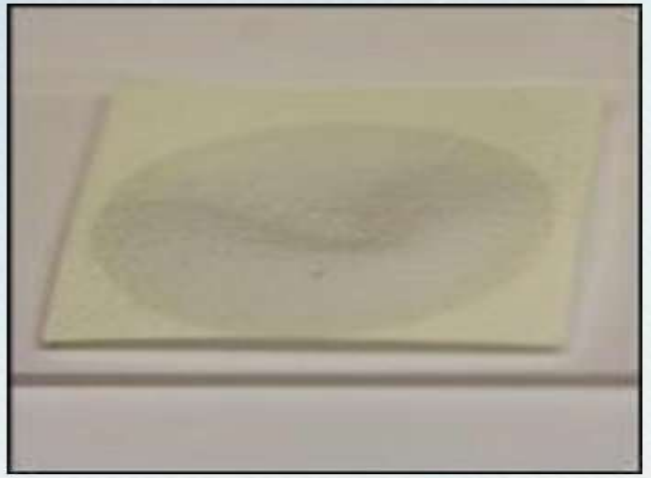
Note: To avoid false-positive reactions, do not test microorganisms growing on media that contain glucose or dyes, such as EMB or MAC, or use a loop or wire containing iron, such as a nichrome wire, to pick the colony. Instead use a plastic loop or a stick.

<u>Interpretation</u>

- Positive reaction = purple or deep blue color change within 10 to 30 seconds
- Weak positive reaction = purple or blue color within 30 to 60 seconds
- Negative reaction = no color change in 60 seconds



Positive



Negative

TSI agar

Triple Sugar Iron Agar

0.1% dextrose

1.0% sucrose

1.0% lactose

(a) Red/red (no sugar fermentation)

(b) Control

(c) Red/yellow (Glucose fermented but lactose and sucrose not fermented)

(d) Yellow/yellow (Glucose fermented. Lactose and/or sucrose fermented)

(e) Red/yellow with H_2S

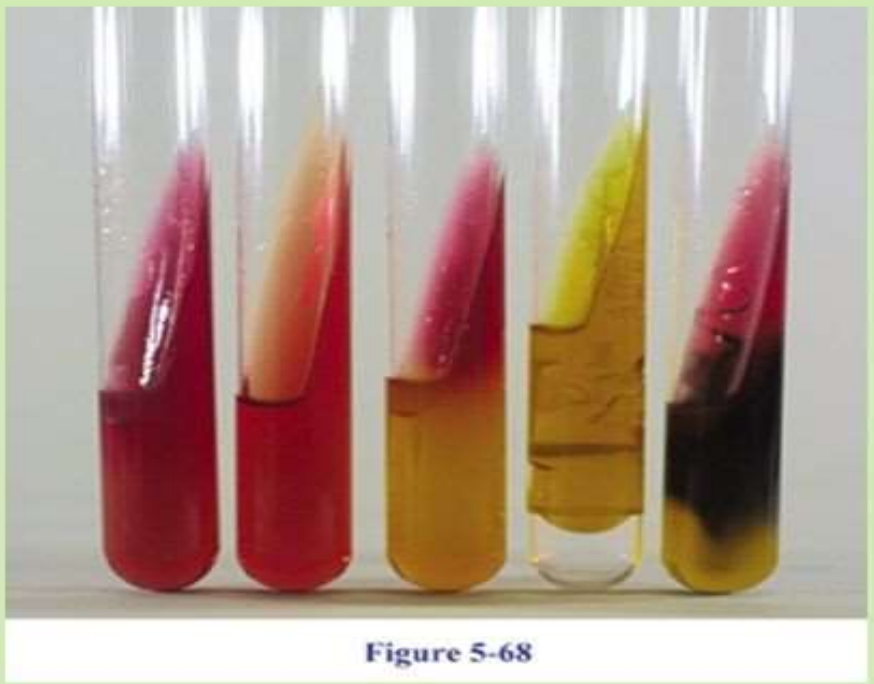
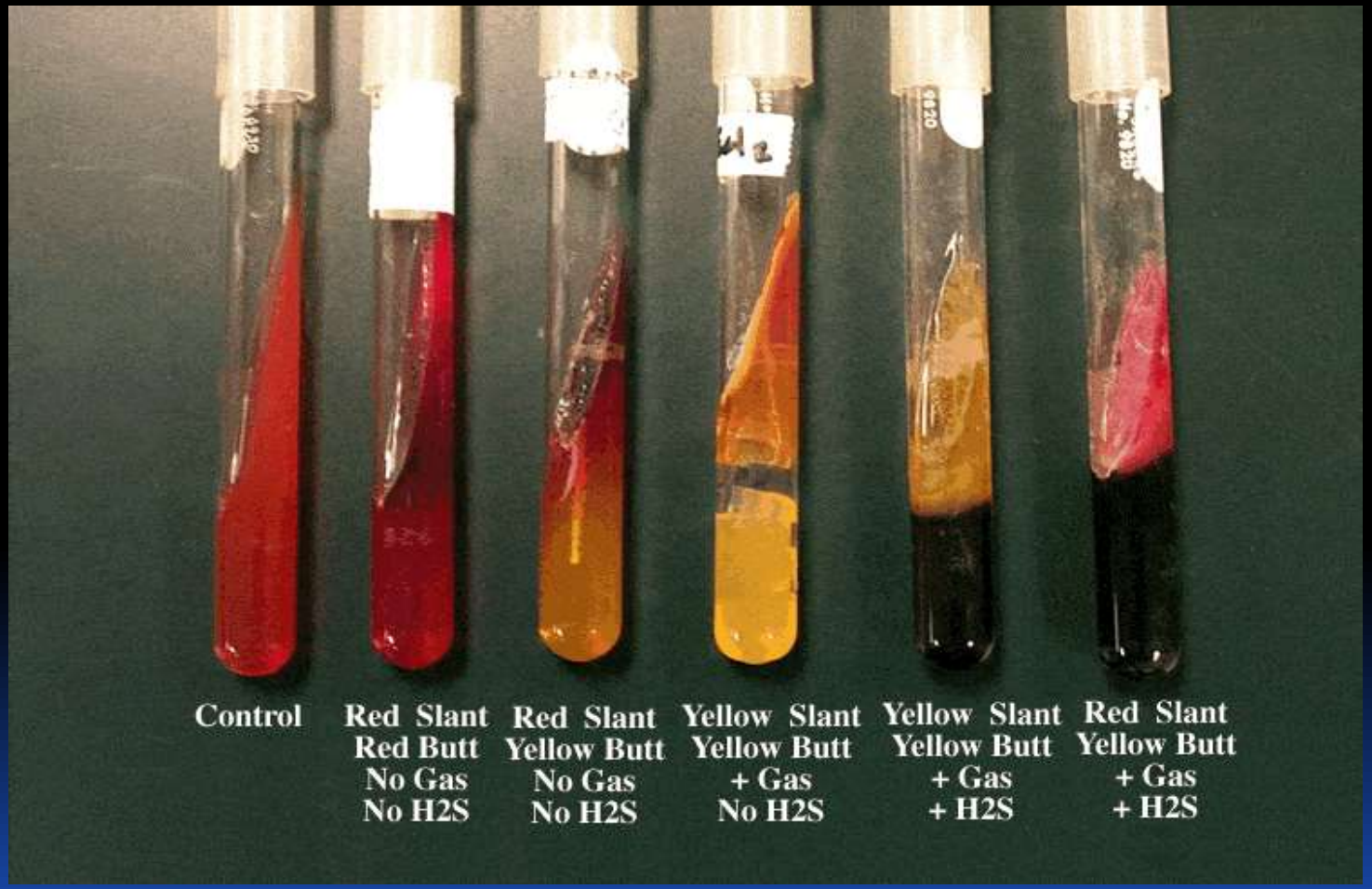


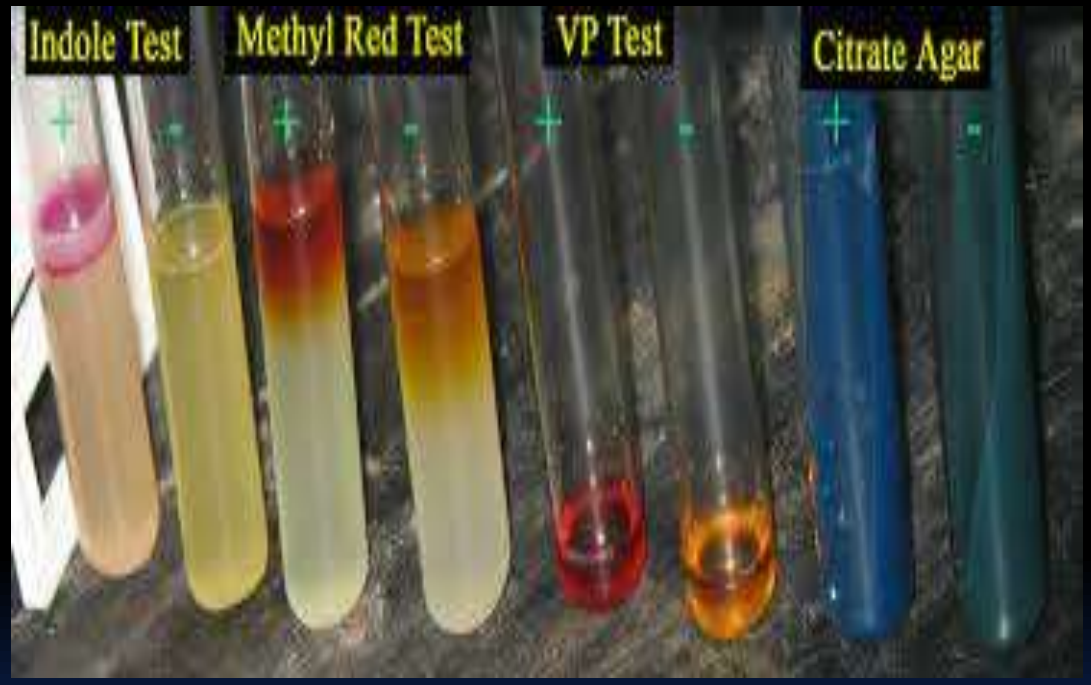
Figure 5-68

7. TSI AGAR


Control
Red Slant
Red Butt
No Gas
No H2S
Red Slant
Yellow Butt
No Gas
No H2S
Yellow Slant
Yellow Butt
+ Gas
No H2S
Yellow Slant
Yellow Butt
+ Gas
+ H2S
Red Slant
Yellow Butt
+ Gas
+ H2S

IMVIC TEST

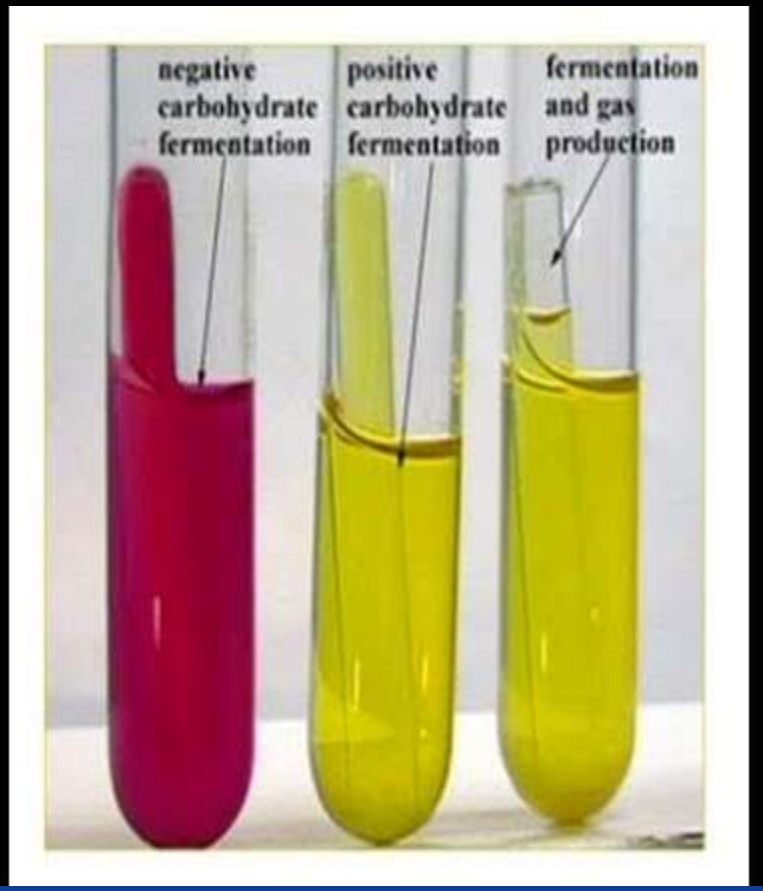
Organism	Indole	Methyl Red	Voges Proskauer	Citrate
Escherichia coli	+	+	-	-
Enterobacter aerogenes	-	-	+	+
Klebsiella pneumonia	-	-	+	+
Proteus mirabilis	-	+	-	+
Proteus vulgaris	+	+	-	-
Salmonella typhi	-	+	-	+
Shigella dysenteriae	-	+	-	+
Citrobacter freundii	-	+	-	+
Serratia marcescens	-	-	+	+
Arizona hinshawii	-	+	-	+



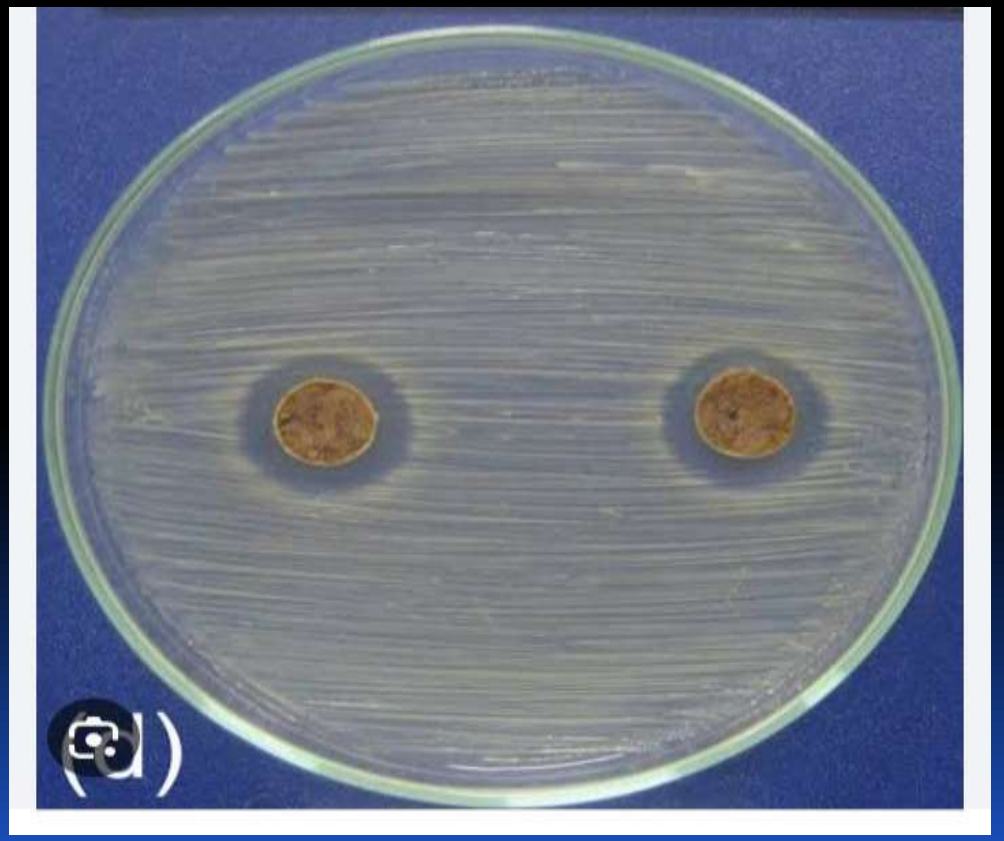
SUGAR FERMENTATION TEST

Glu	Suc	Fru	Lac	Gal	Mal	Suspected Organism
+	-	-	-	-	-	*Bacillus cereus*
+	+	+	+	+	+	*Enterobacter aerogenes*
+	-	+	-	+	-	*Proteus mirabilis*
+	-	-	-	+	+	*Klebsiella pneumoniae*
+	-	-	-	+	-	*Staphylococcus aureus*
-	+	-	+	+	-	*Pseudomonas aeruginosa*
+	-	-	-	+	-	*Staphylococcus epidermidis*
+	-	-	-	-	-	*Bacillus subtilis*

Keys: GLU=Glucose, SUC= Sucrose, FRU= Fructose, LAC=Lactose, GAL= Galactose, MAL= Maltose. + = Present; - = Absent

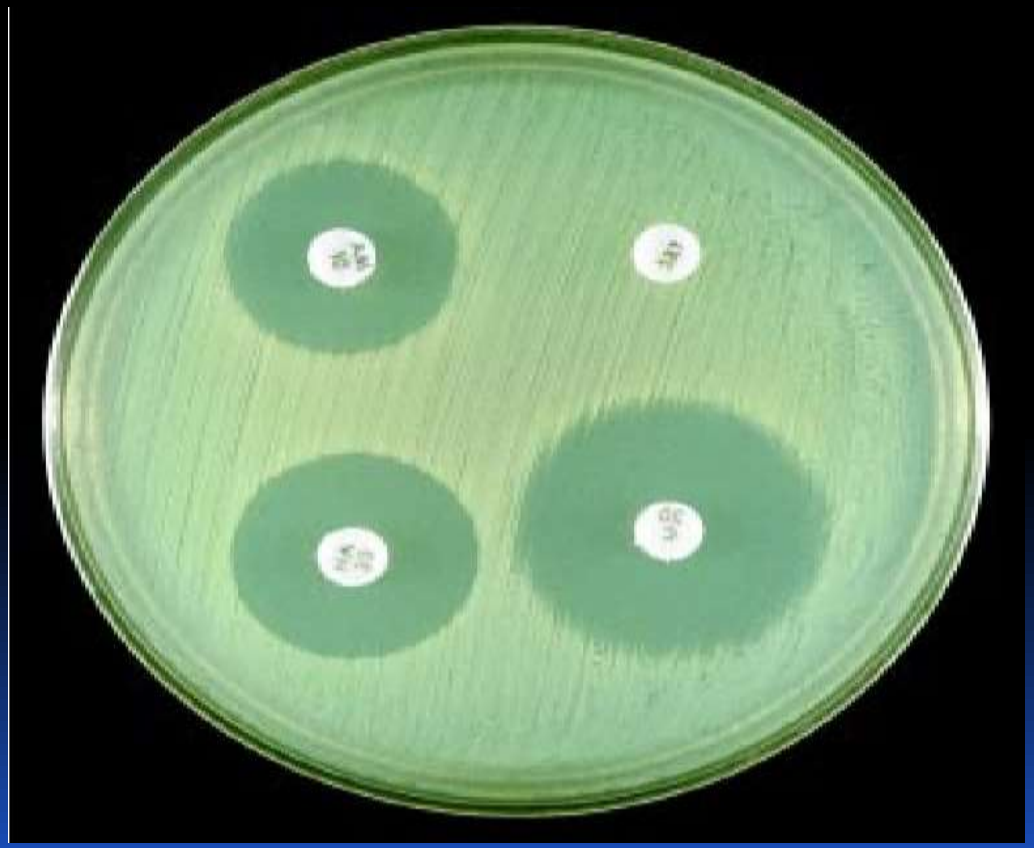


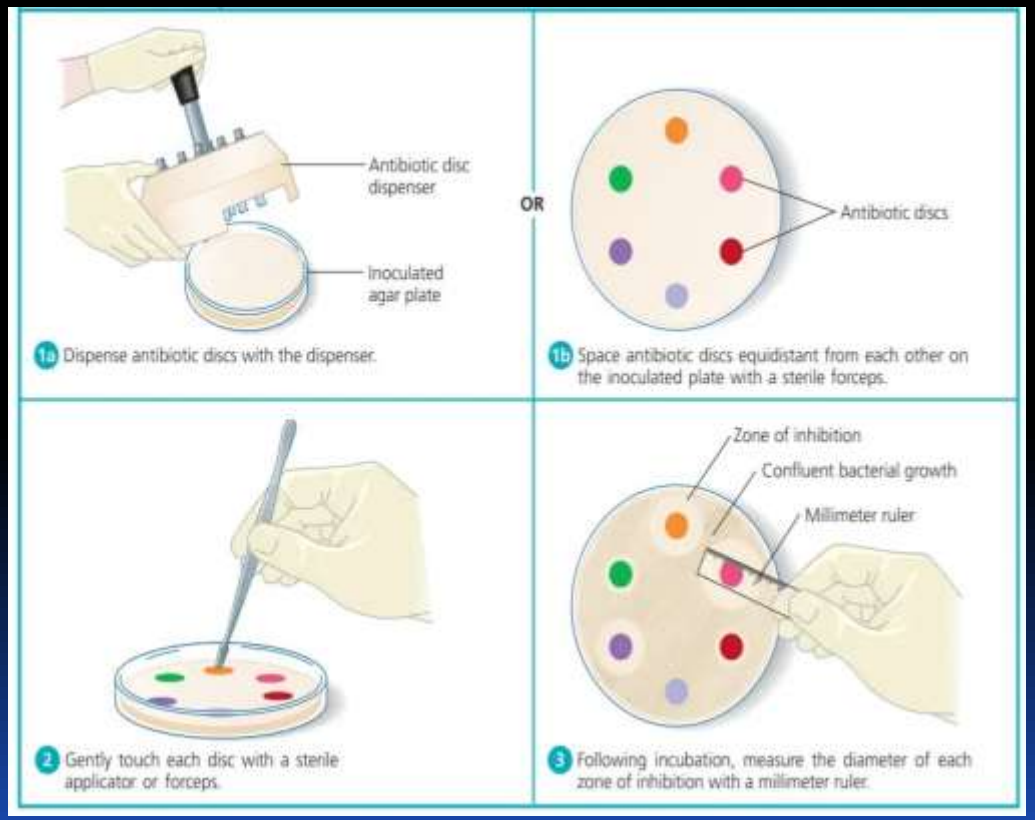
Oligodynamic action Of heavy metals



4. Mueller-Hinton agar

Disc diffusion method





Epsilometer Test/ E-strip method


Thank
You