

Respiratory system

Microbiology laboratory section



THROAT SWAB

**Gram Positive
Coccus**



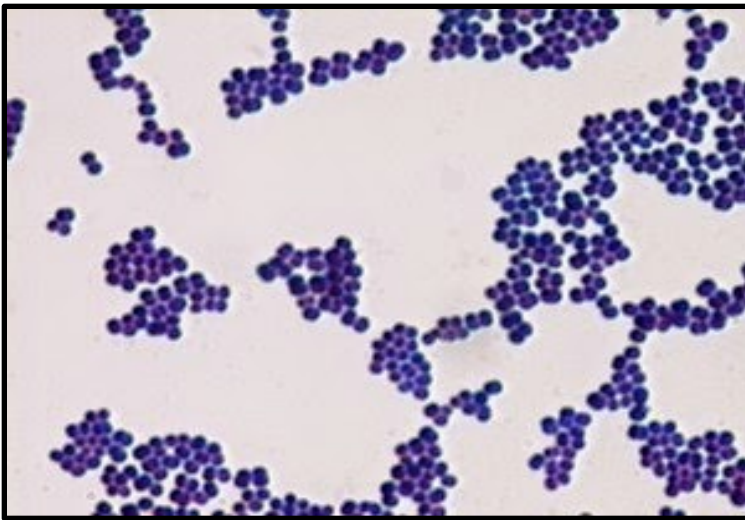
**Staphylococcus
Spp.**

**Streptococcus
Spp.**

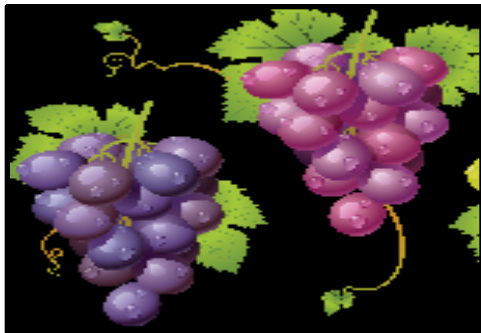
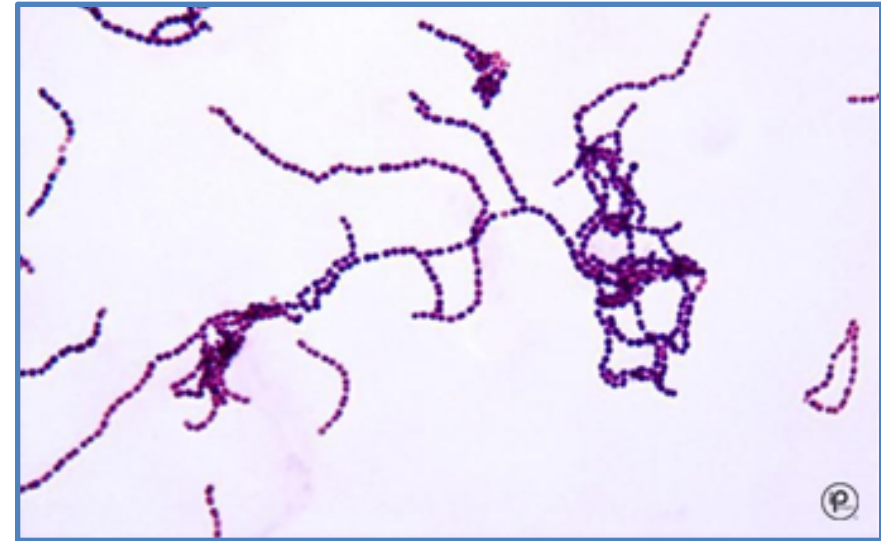
GRAM STAIN



Staphylococcus



Streptococcus



A- staphylococcus .albus

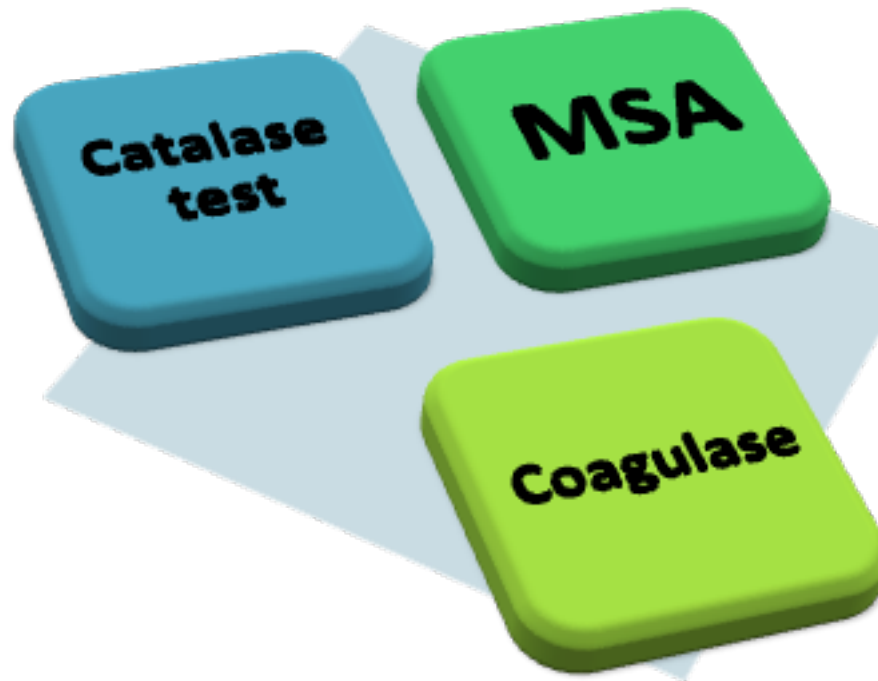


B- staphylococcus.Aureus

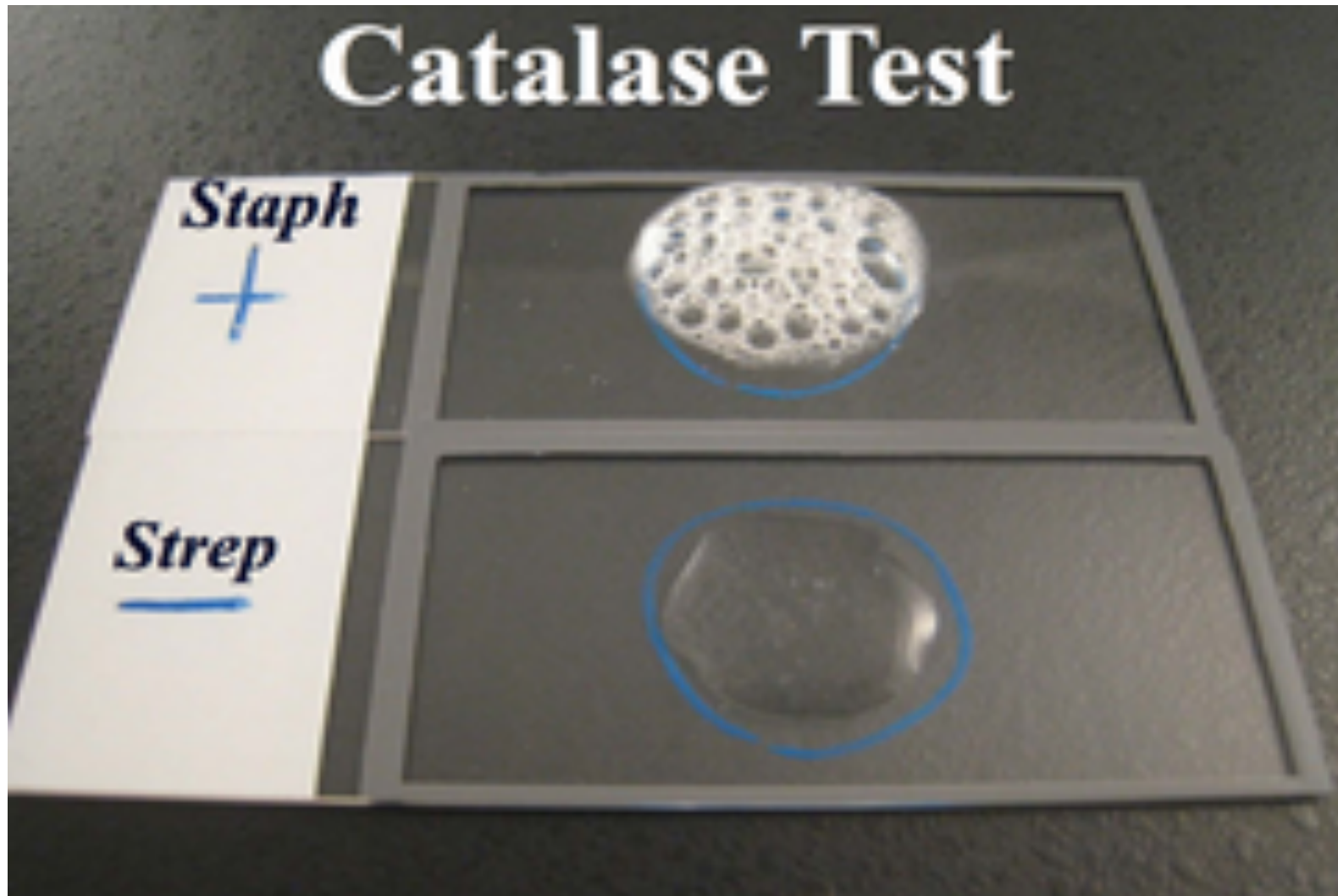


Blood agar

Test for differentiation of Staphylococcus species

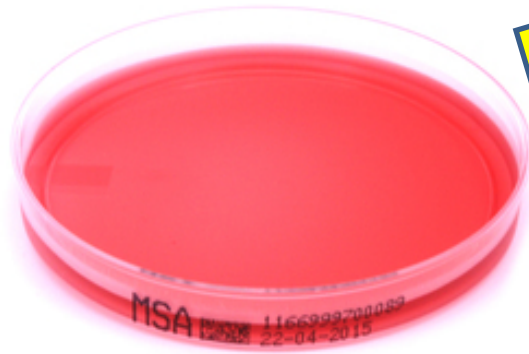


Catalase test

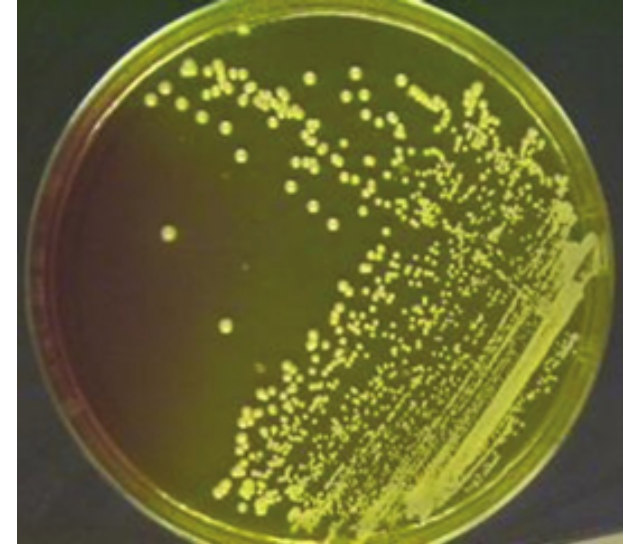


MSA

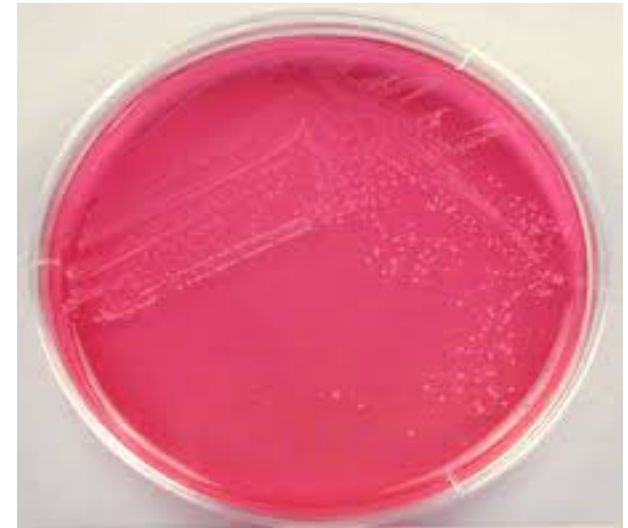
Mannitol salt agar media



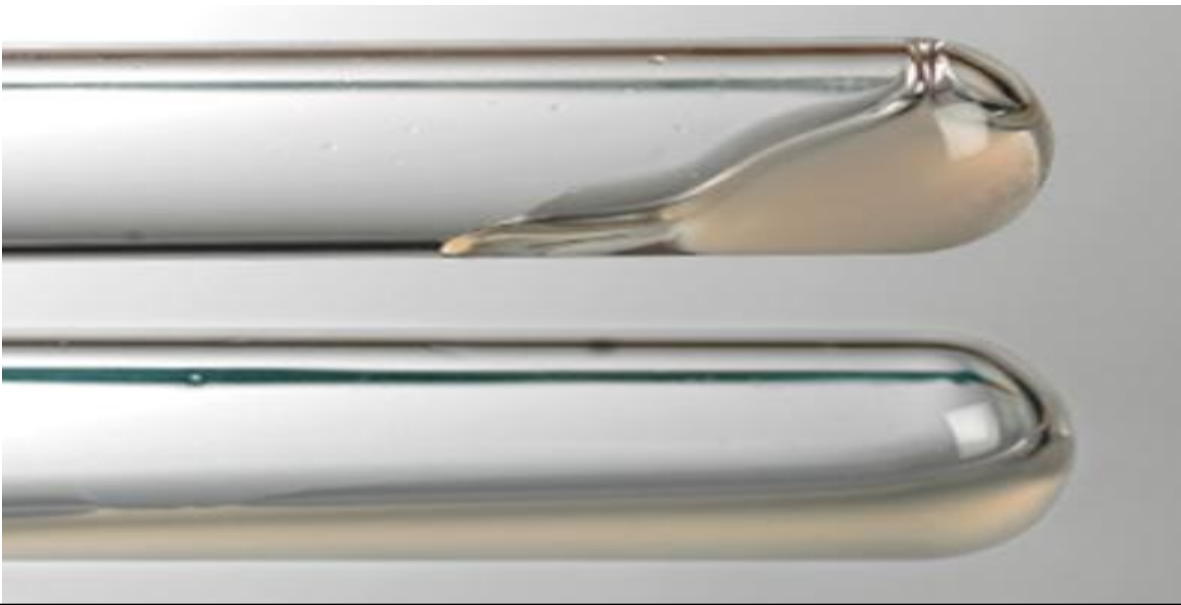
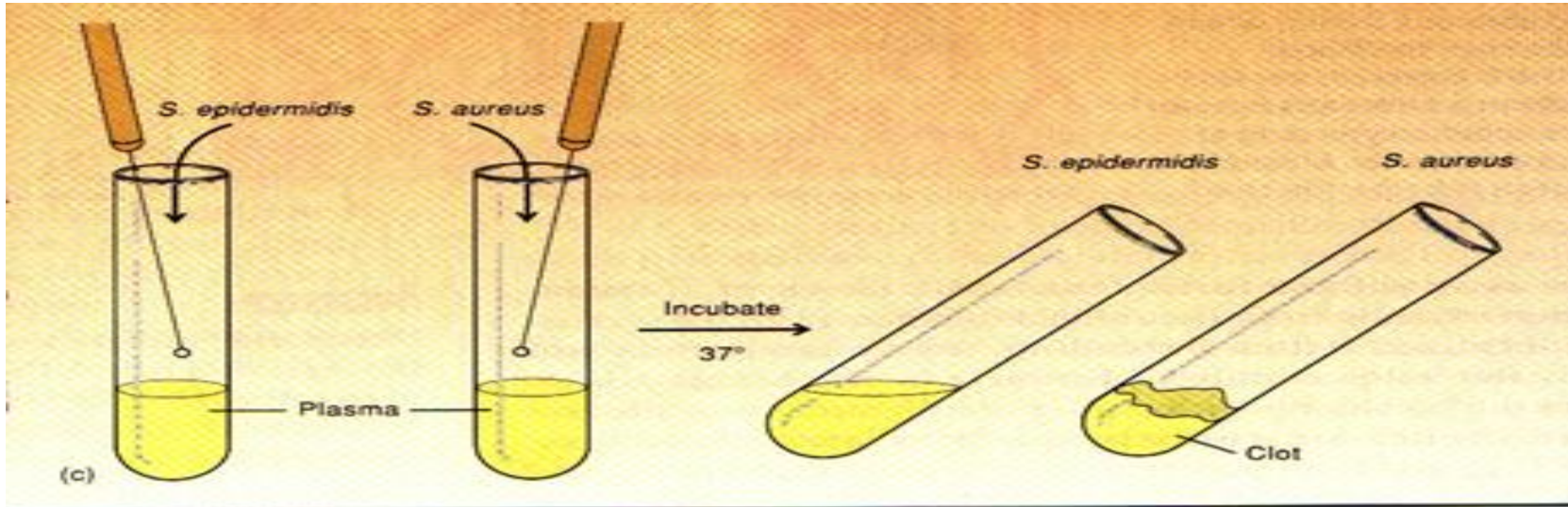
S.aureus



S.albus



Coagulase test



Streptococcus



α -hemolytic

green,
partial hemolysis

β -hemolytic

clear,
complete hemolysis

γ -hemolytic

no hemolysis

pneumoniae

optochin sensitive,
bile soluble,
capsule =>
quellung +

Viridans

mutans, sanguis
optochin resistant,
not bile soluble,
no capsule

pyogenes

Group A,
bacitracin sensitive

agalactiae

Group B,
bacitracin resistant

Enterococcus

E. faecalis,
E. faecium

Hemolysis on sheep blood agar

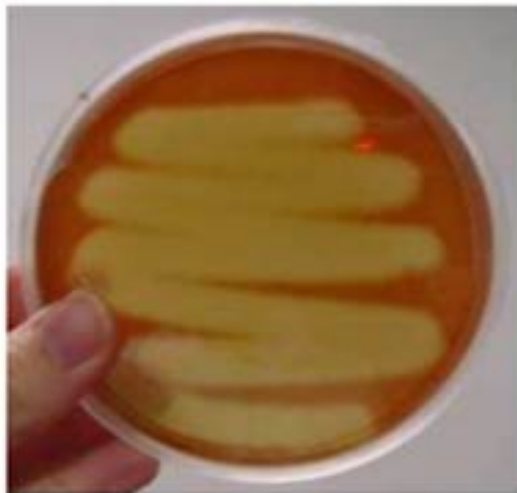
Blood Agar:

Shows three types of hemolysis

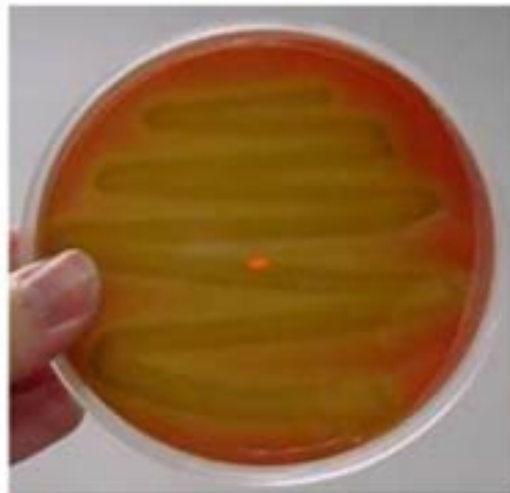
α Hemolysis

β Hemolysis

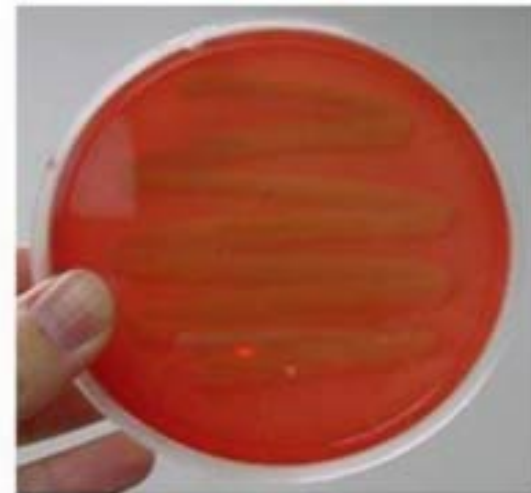
γ Hemolysis



Beta Hemolysis



Alpha Hemolysis

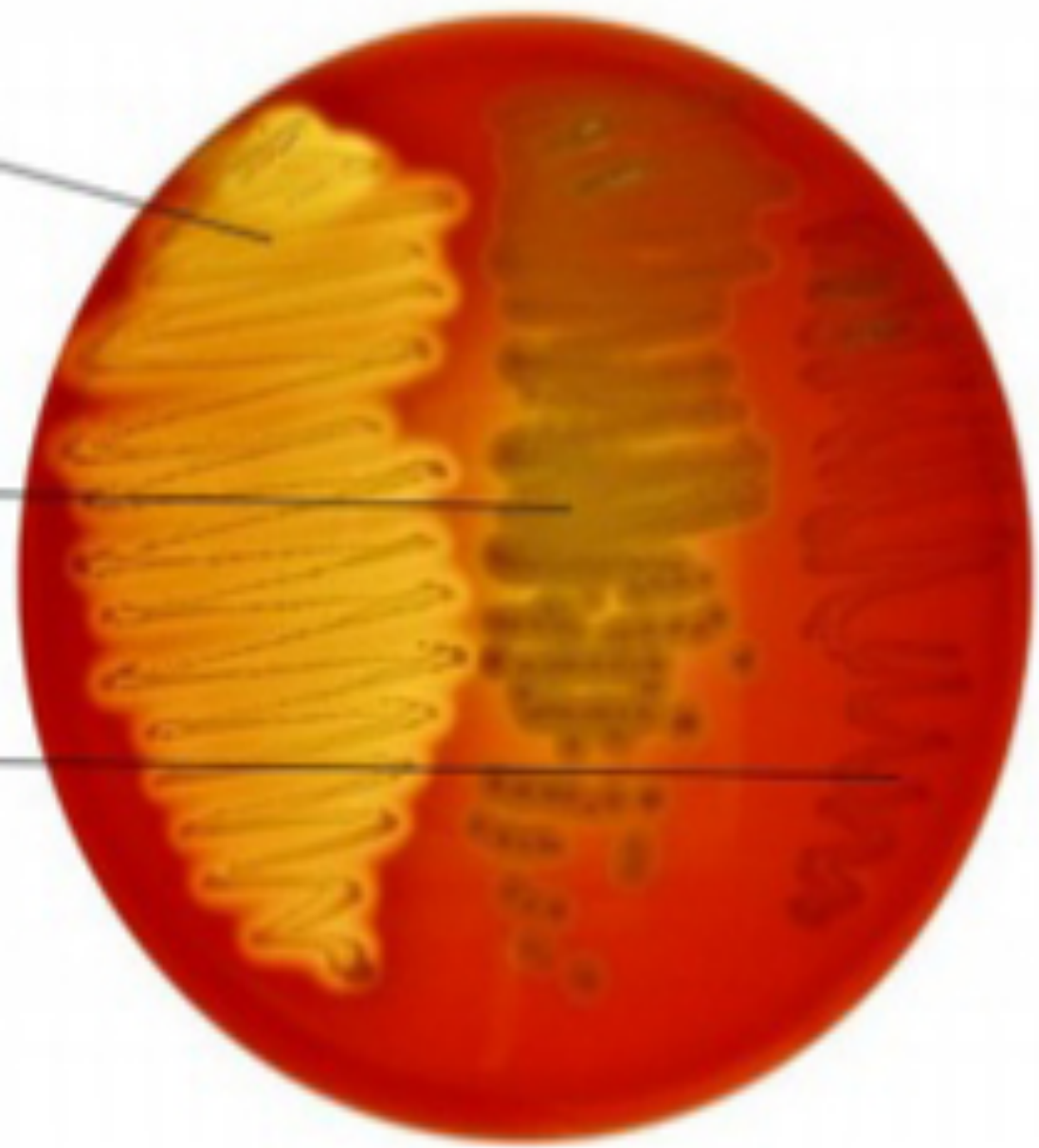


Gamma Hemolysis

Beta

Alpha

None



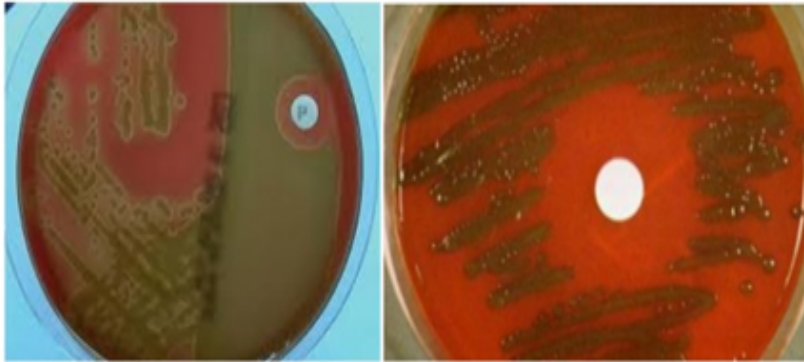
Differentiation between α -hemolytic streptococci

	Hemolysis	Optochin sensitivity
<i>S. pneumoniae</i>	α	Sensitive (≥ 14 mm)
<i>Viridans strep</i>	α	Resistant (≤ 13 mm)



Optochin test

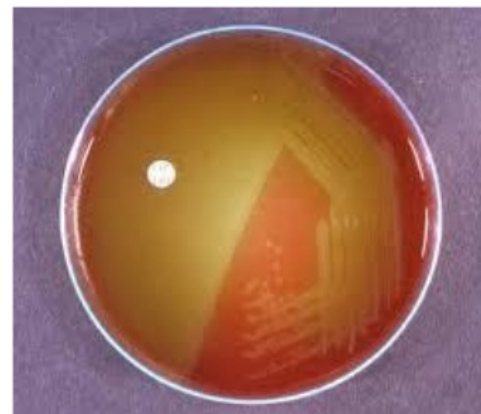
Streptococcus pneumoniae



Streptococcus pneumoniae strain on blood agar showing alpha hemolysis (green zone surrounding colonies). Note the **zone of inhibition** around a filter paper disc impregnated with optochin. (**sensitive** to optochin)

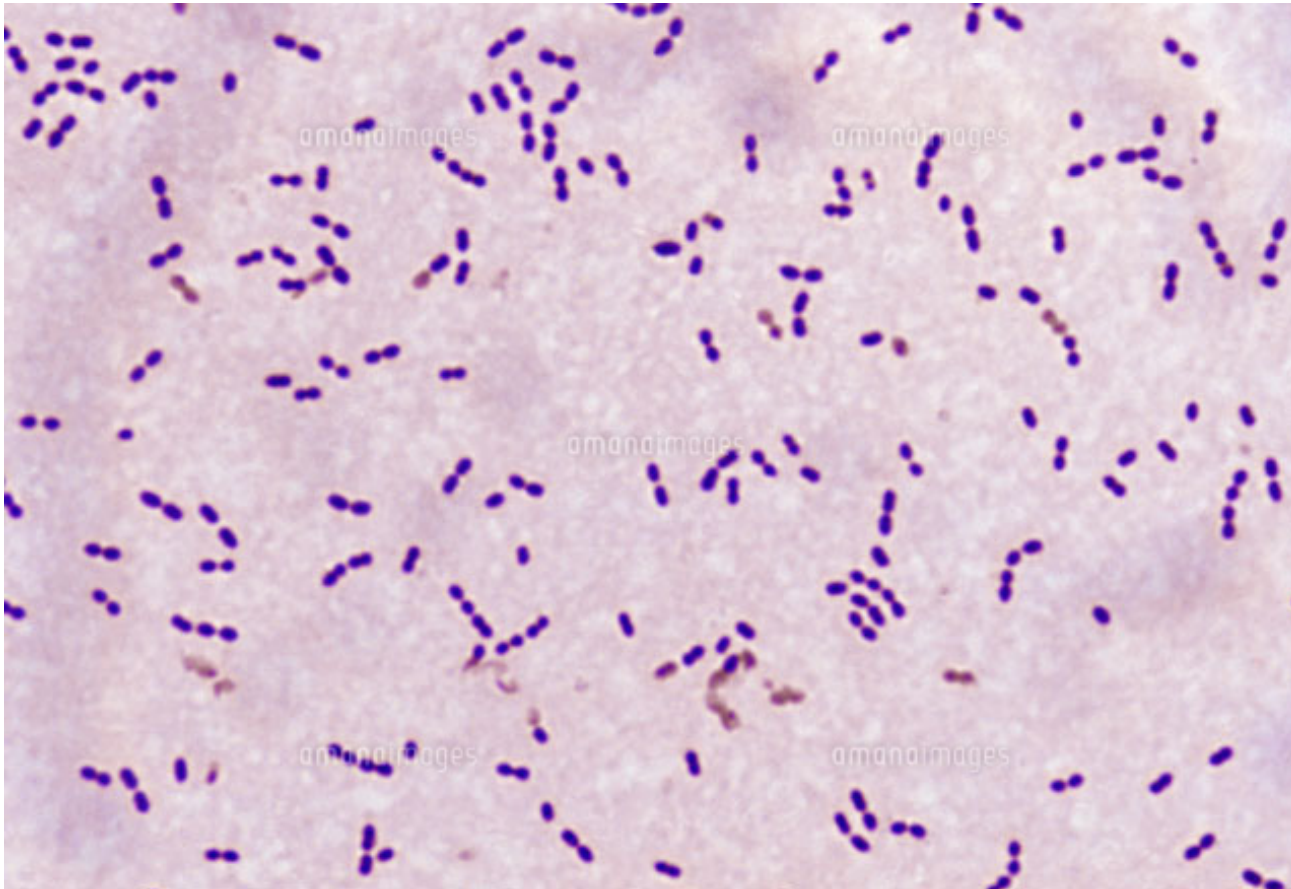
Optochin test

Streptococcus viridans

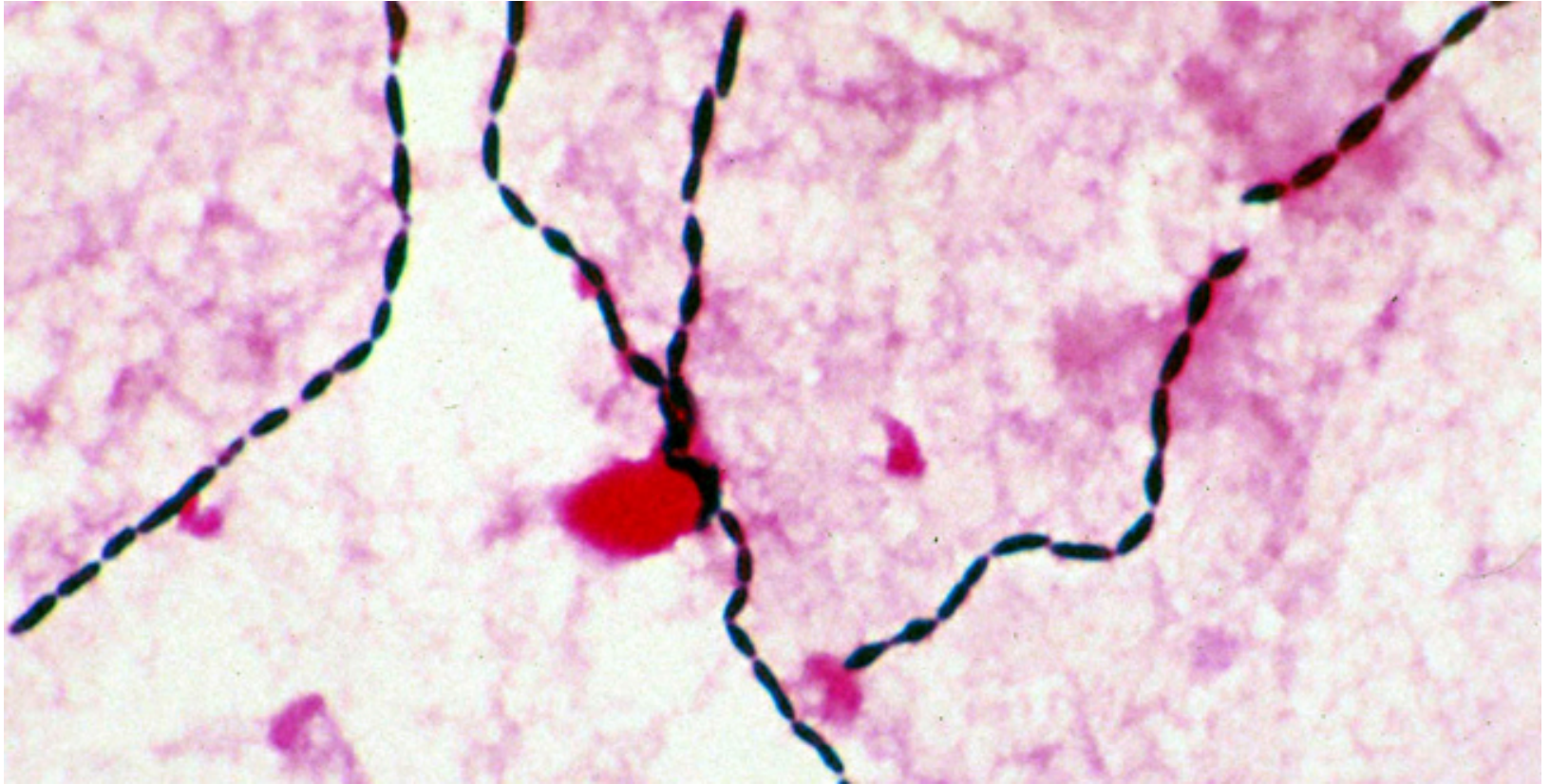


Streptococcus viridans strain on blood agar showing alpha hemolysis (green zone surrounding colonies). **No zone of growth inhibition (Resistant)** around a filter paper disc impregnated with optochin.

Streptococcus pneumoniae



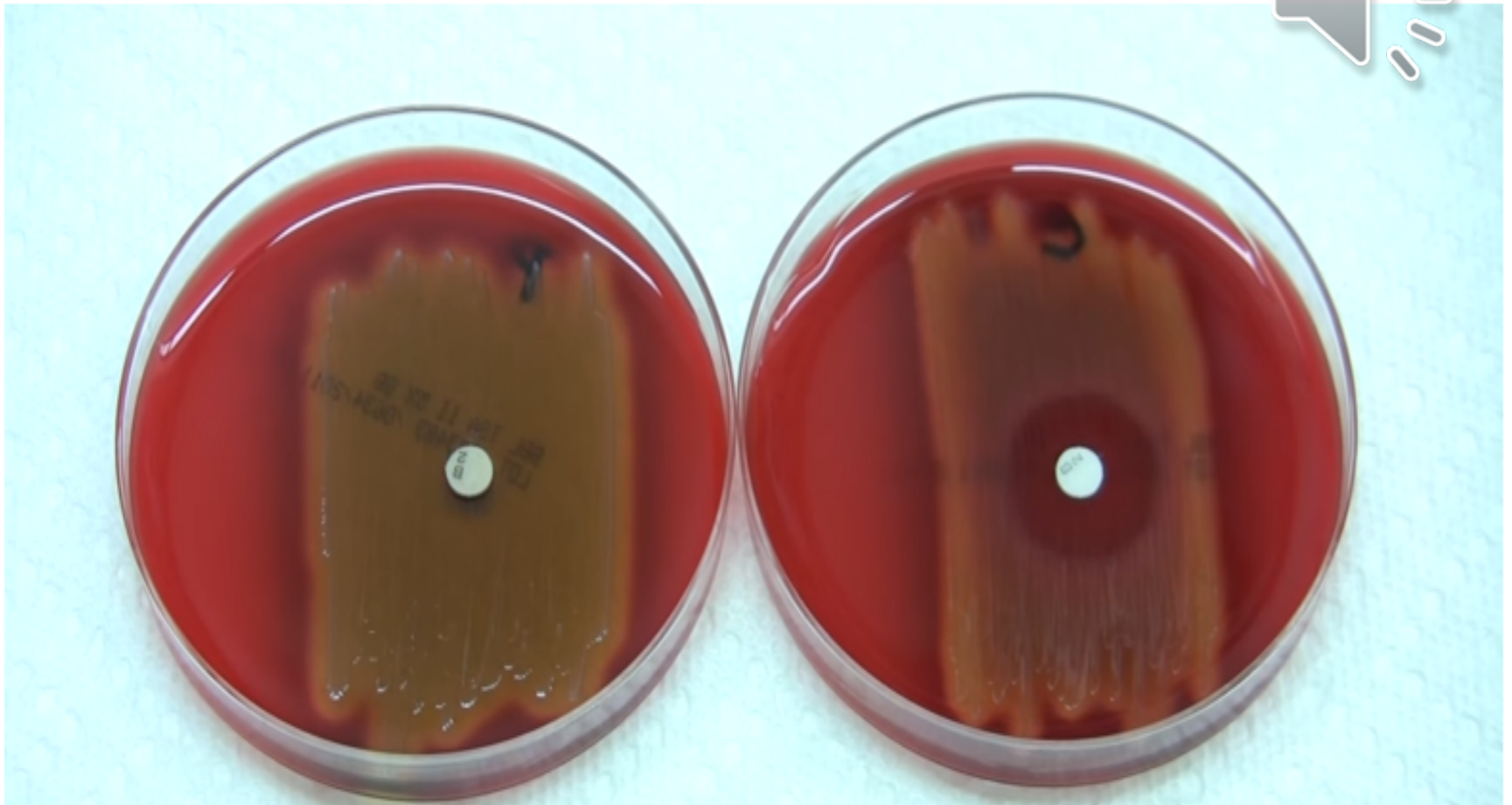
Streptococcus viridans



Differentiation between β -hemolytic streptococci

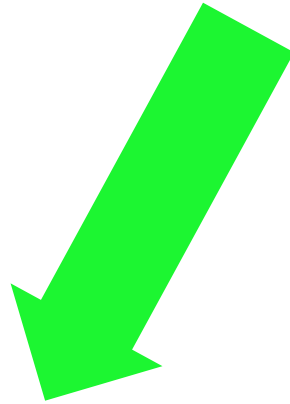
	Hemolysis	Bacitracin sensitivity
<i>S. pyogenes</i>	β	Susceptible
<i>S. agalactiae</i>	β	Resistant





Bacitracin test for *Streptococcus pyogenes*

Gamma hemolysis streptococcus

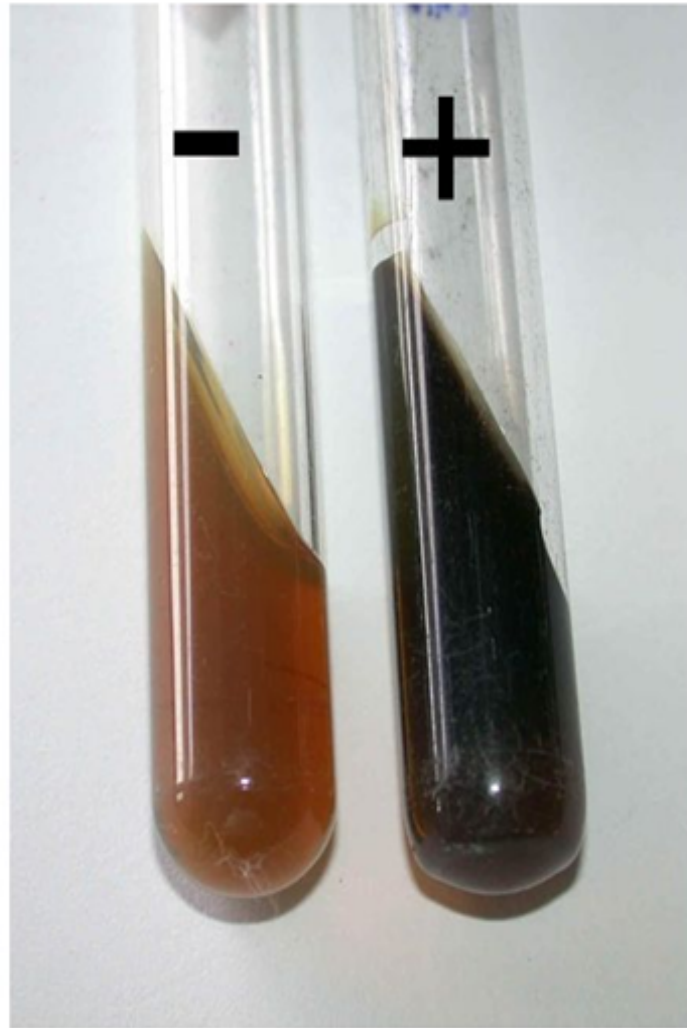


**Enterococcus
Group D
- E.feacalis**



**Other than
Enterococcus
group D**

Bile-Esculin



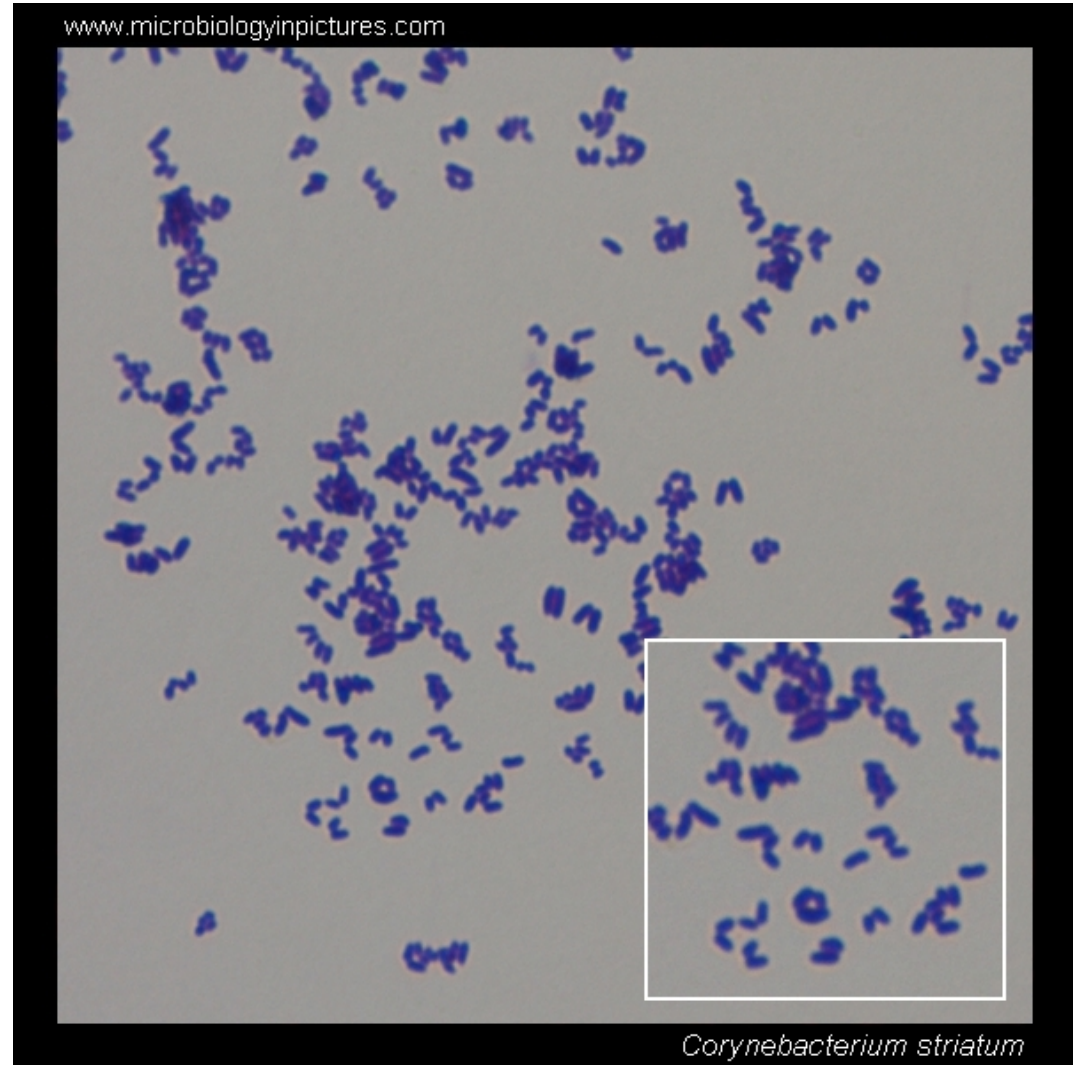


Diphtheroids

**Gram Positive
Cocco-bacilli**

**Arrangement as
Chinese letter**

文学家



Candida Species

C.albicans

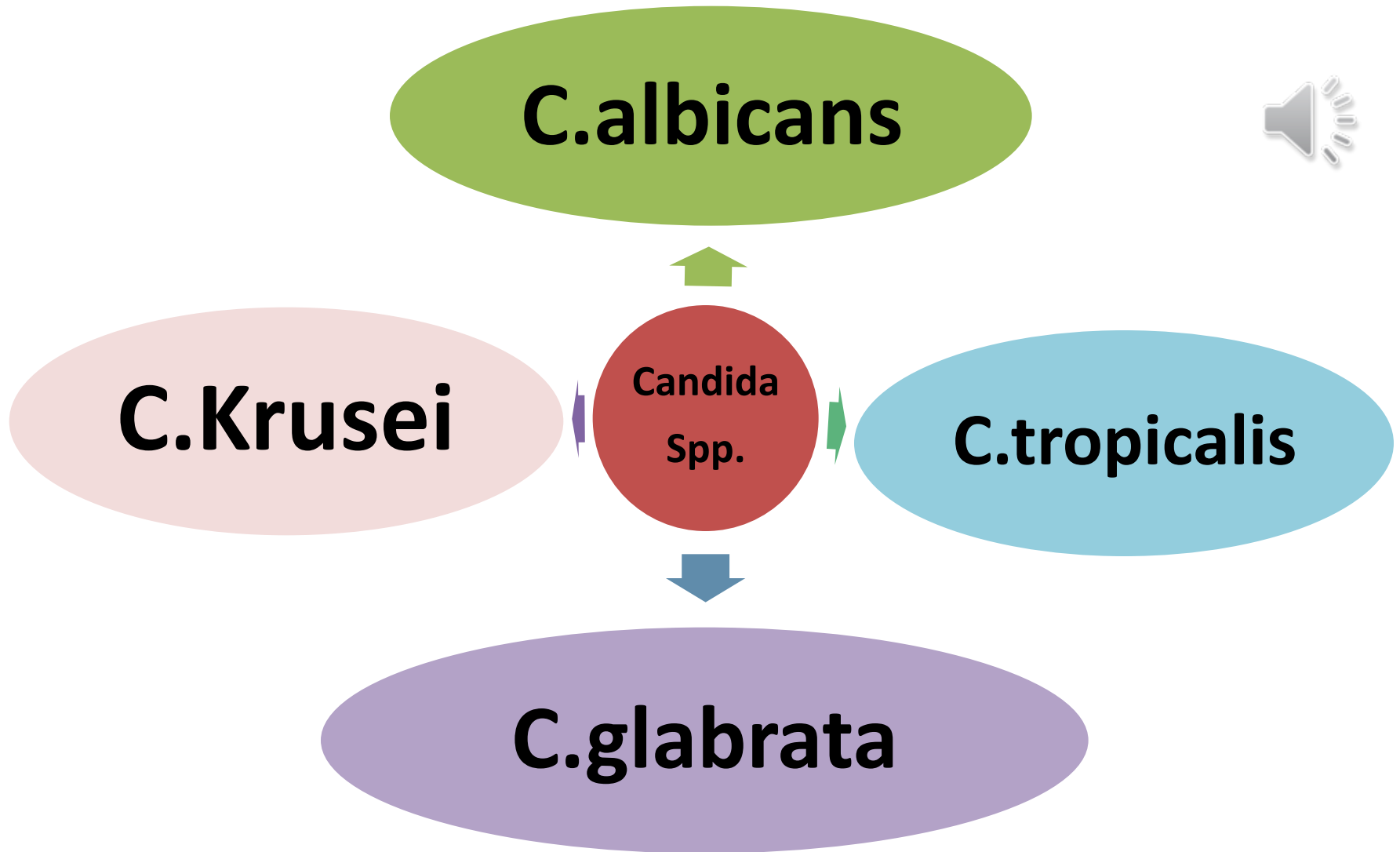


C.Krusei

**Candida
Spp.**

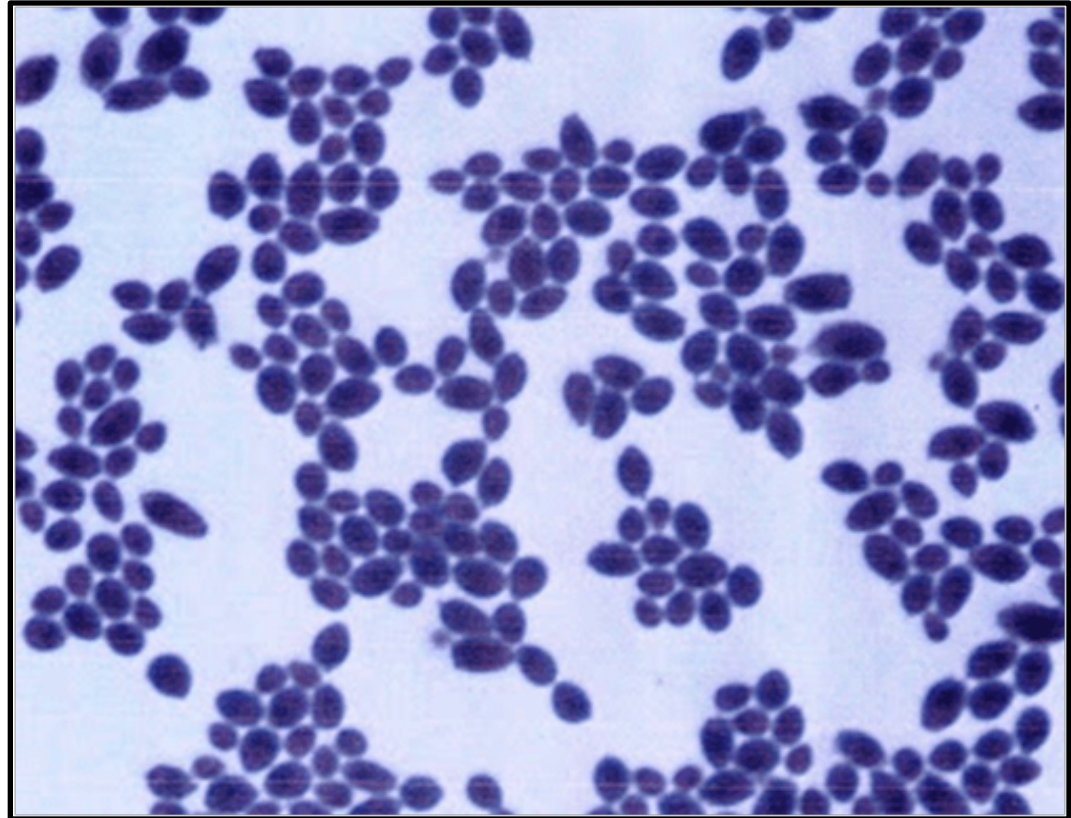
C.tropicalis

C.glabrata

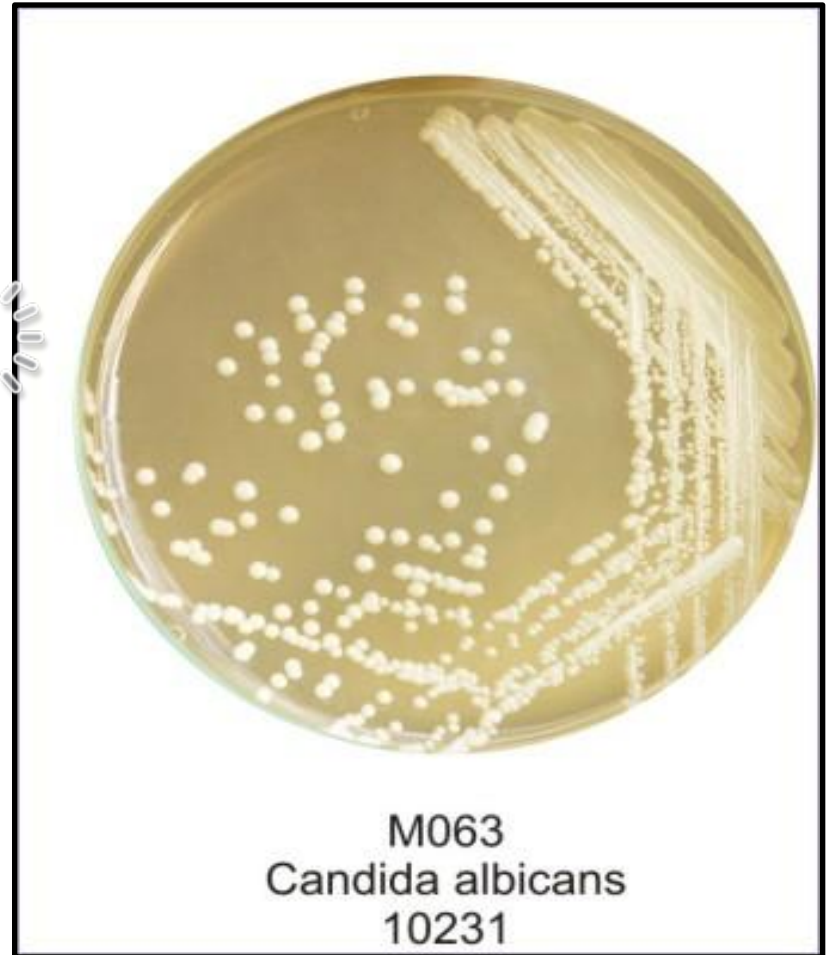


Candida Spp

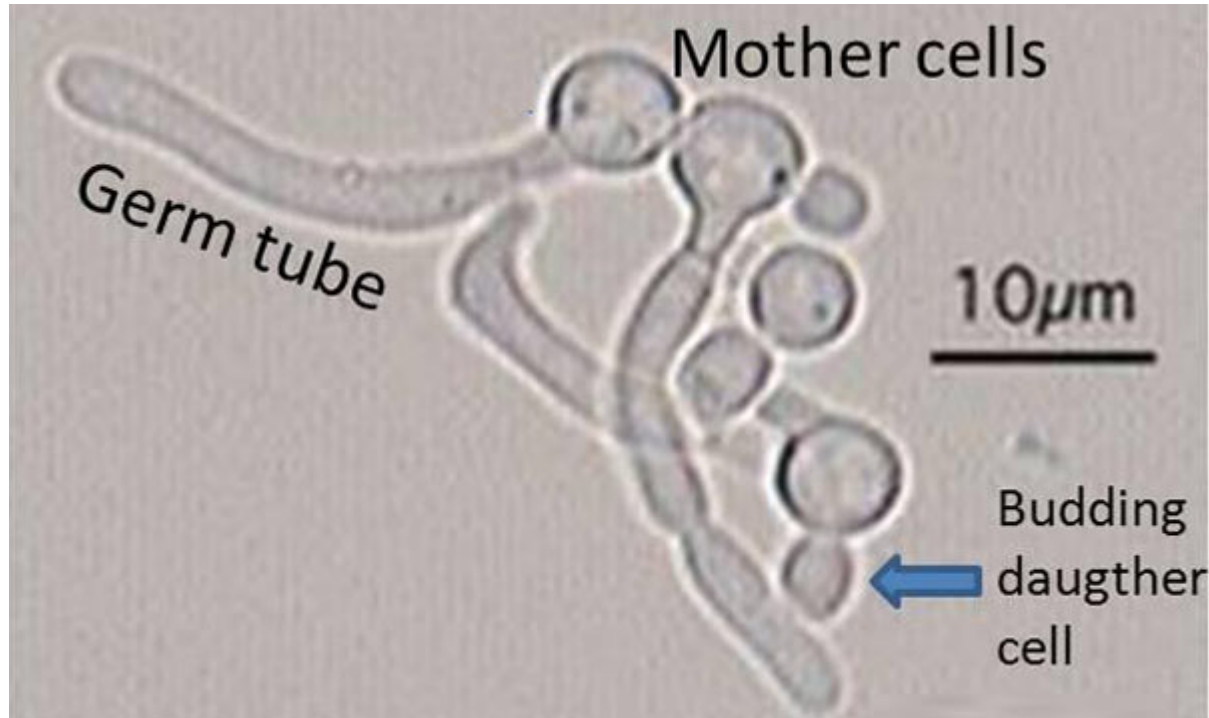
- Larger than Bacteria
- Budding



sabouraud dextrose agar



To Differentiate between C.albican and other Species



Germ tube
[Serum + candida]



Chrom agar



**C.glabrata : violet (dark pink)
glistening**

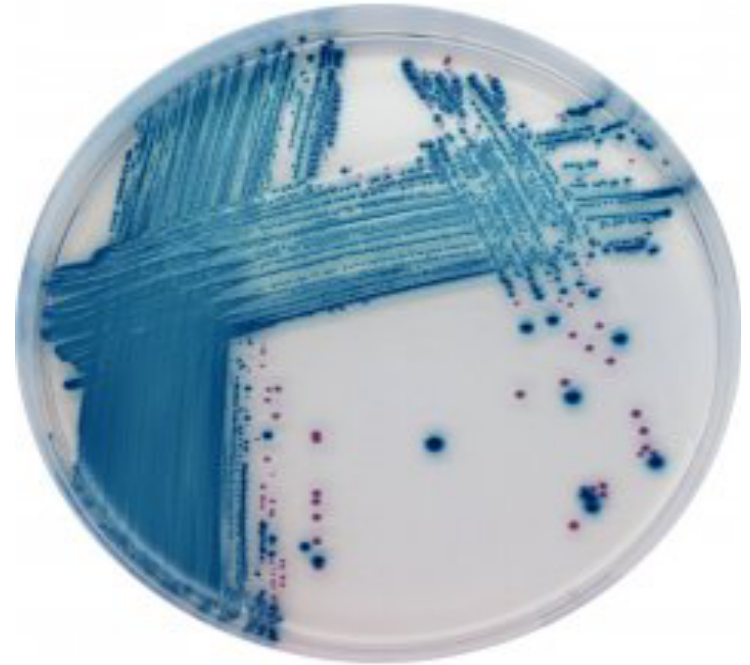


C.albicans : Green

Chrom agar

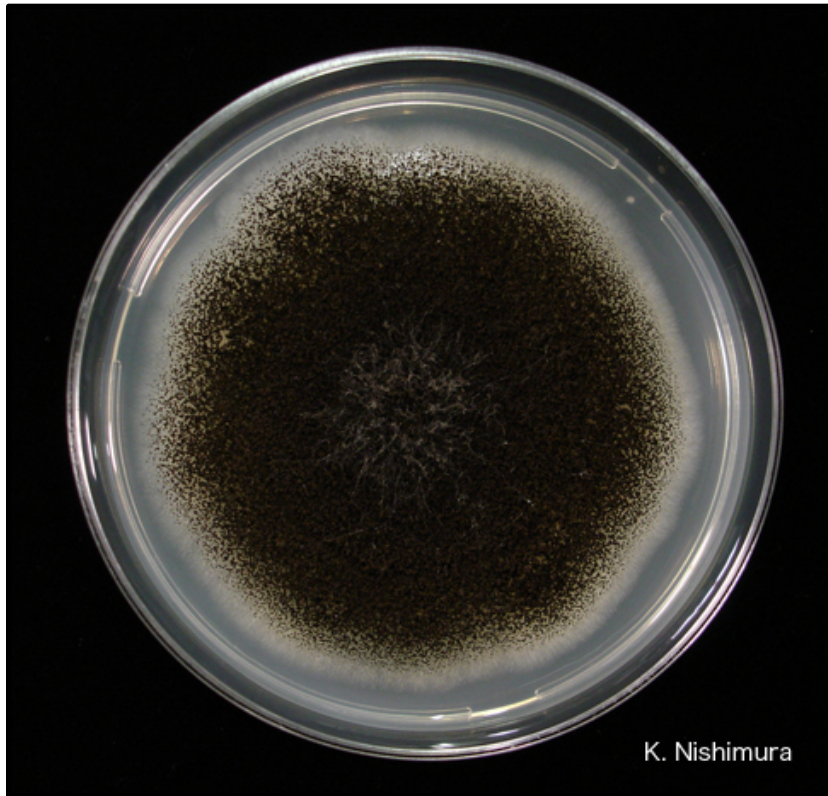


**C. Krusei : rough
dry pale pink**

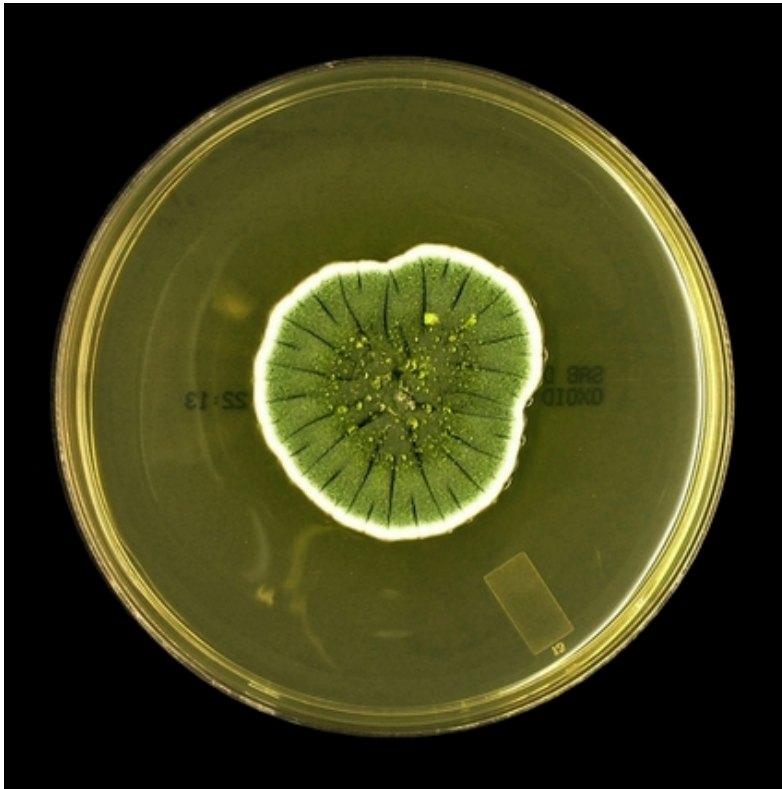


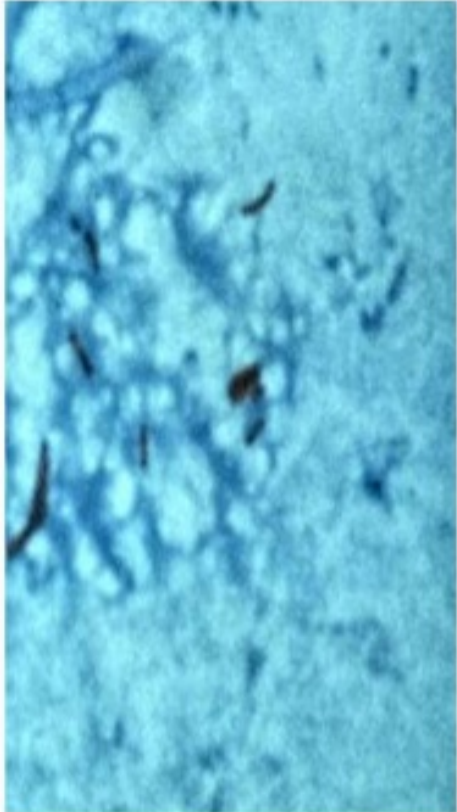
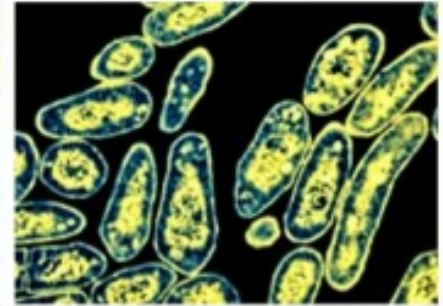
**C. Tropicalis
Blue**

Aspergillus Niger

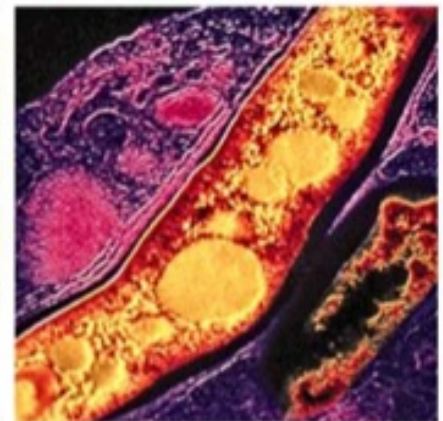
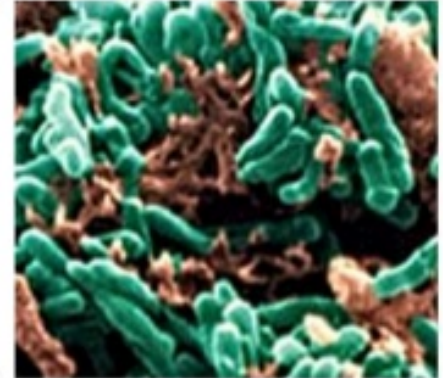


Penicillium Spp.





MYCOBACTERIUM
TUBERCULOSIS



Lowenstein –Jensen Medium

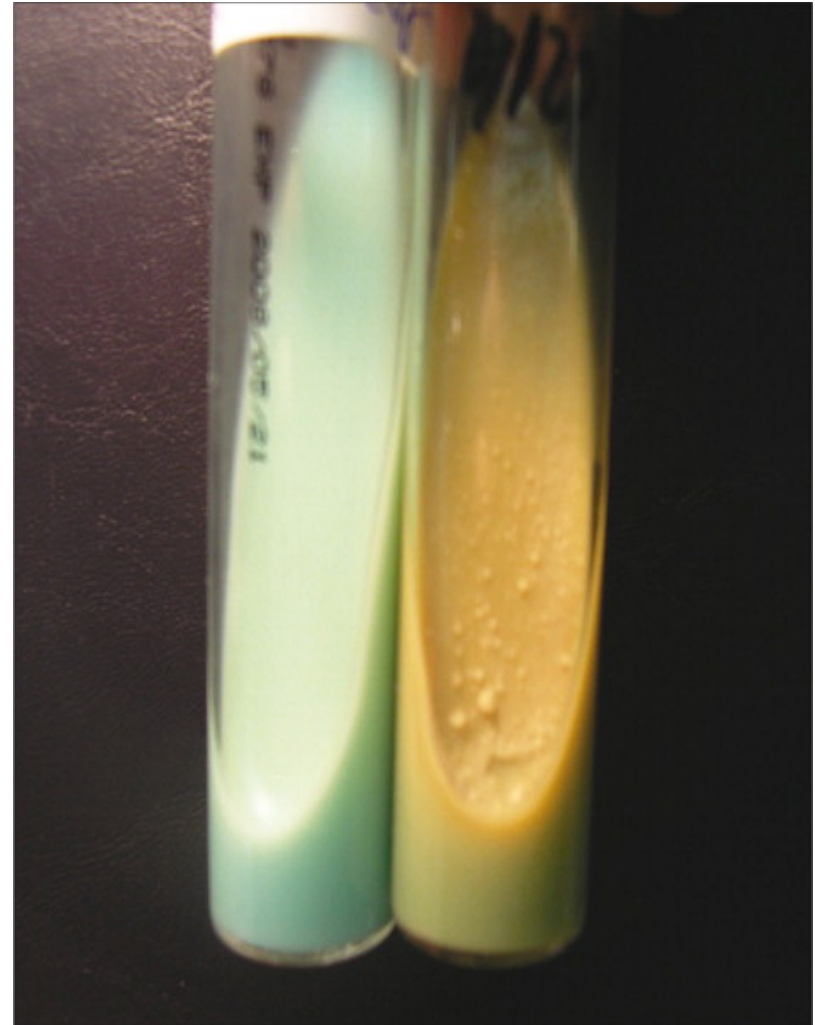
- Contain malachite green and egg albumin
- Media color : green
- Cell show :



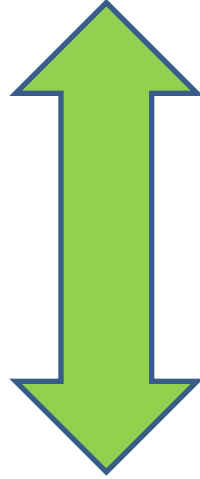
Rough

Tough

Buff



Incubation Period = 4 weeks



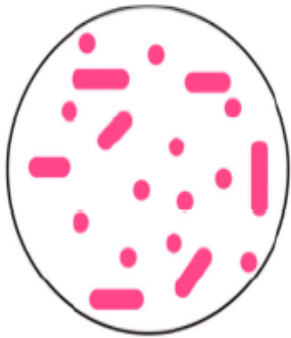
**Put the media in covered tubes
to avoid drying of media**

ziehl neelsen Acid fast stain

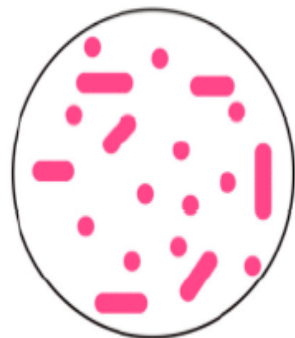
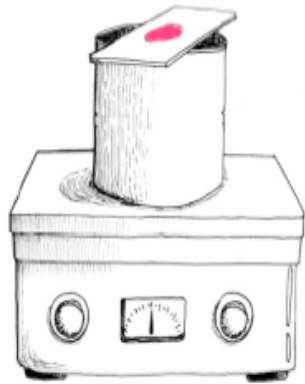
- Mycobacterium Tuberculosis cell wall are waxed for that reason do heating while staining .
- Stain made of :



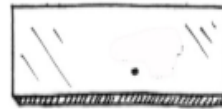
- **Carbol fuchsin**
- Hydrochloric acid alcohol (3% HCL)
- **Methylen blue**



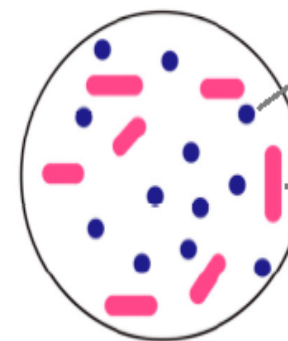
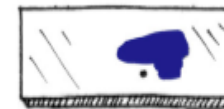
Application of
Carbolfuchsin
(primary stain)



Application
of heat
(mordant)



Application of
Acid Alcohol
(decolorizer)



Application of
Methylene Blue
(counter stain)

Non Acid Fast

Acid Fast



T.B Acid fast stain

