



Ministry of Higher education and scientific research

University of Tikrit

College of science

Department of Biology

Lab. of Practical Microbiology (1)

For second stage - 2025-2026

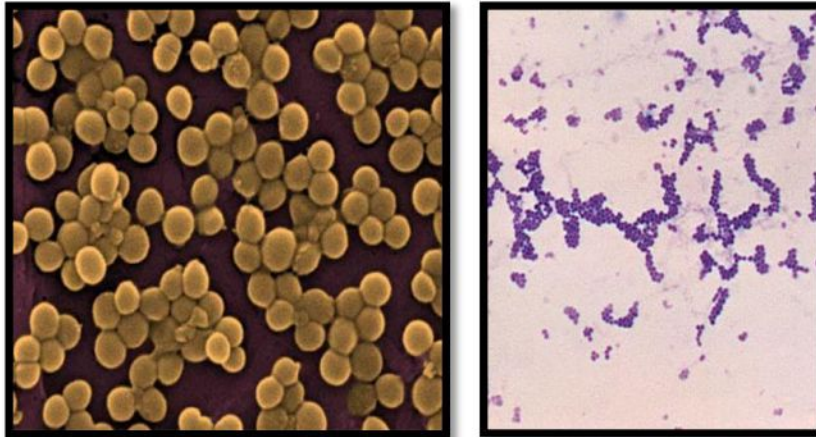


مدرس المادة : بشري علي كاظم

Gram positive bacteria

Staphylococci

Spherical gram positive cocci arranged in irregular clusters, non-motile, non-sporing, fermenting many carbohydrates.



producing pigments white and deep yellow, hemolyse blood, coagulate plasma.

some are normal flora of skin, others are pathogenic causing:

1. Suppuration.
2. Abscess formation.
3. Fatal septicemia.
4. Food poisoning.

Toxins and enzymes:

Staphylococci can produce disease through their ability to multiply and spread widely in tissues and through their production of many extracellular substances these are:

1. Exotoxin: Contain hemolysin.
2. Leukocin: Kill exposed white blood cells.
3. Enterotoxin: Resist boiling for 30 min., cause food poisoning.

Biochemical Reactions

Catalase Test

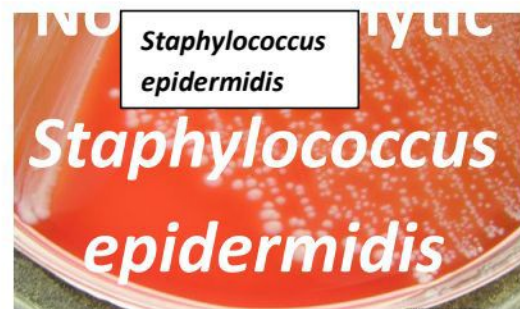
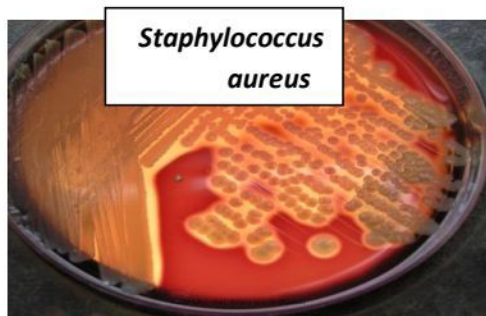
This test can be distinguished between *Staphylococcus* bacteria spp. from the other types of bacteria. All *Staphylococcus* spp. have a catalase enzyme which acts on hydrogen peroxide to release oxygen. In the test we can observe the immediate bubbles.



The two major species of this genus are:

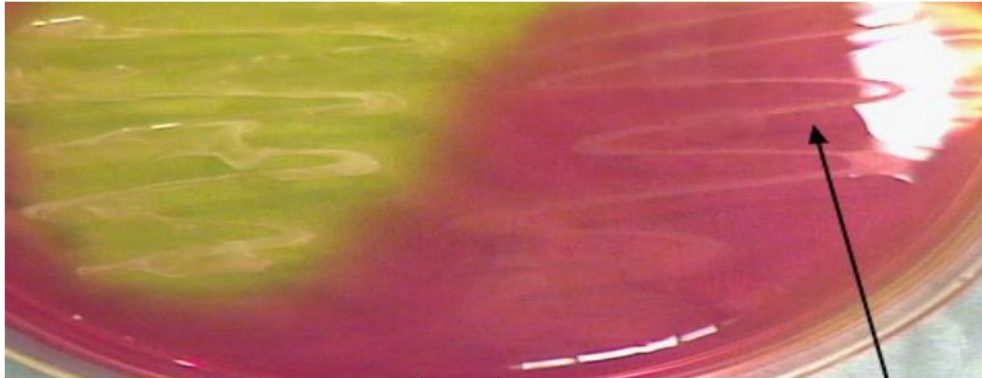
1) *Staphylococcus aureus*. 2) *Staphylococcus epidermidis*

Name of bacteria	Hemolysis	Pigments	Mannitol fermentation	Coagulase
<i>S. aureus</i>	+ve	Golden	+ve	+ve
<i>S. epidermidis</i>	-ve	White	-ve	-ve



Mannitol Salt Agar – Selective for Staphylococcus. Differentiates between *S. aureus* and *S. epidermidis*.

***S. aureus* is able to ferment Mannitol.**



Staphylococcus aureus

Staphylococcus epidermidis

***Staphylococcus aureus*: possesses this enzyme which acts on plasma to form a clot, this enzyme called coagulase, there are two methods to detect it:**

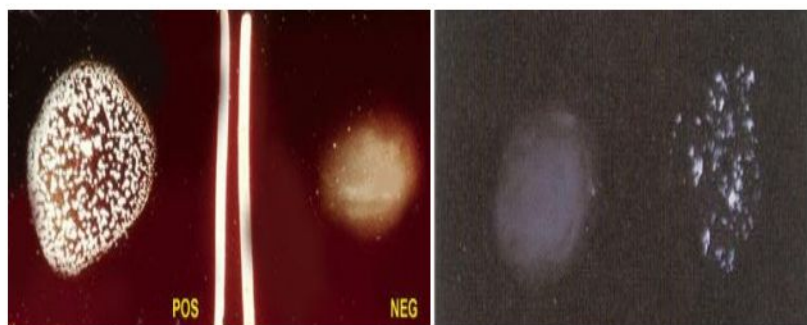
A) Tube method:

Diluted plasma is mixed with a suspension of bacteria following incubation at 37°C, clot formation indicated coagulase results in fibrin deposition which interferes with phagocytosis and increases the ability to invade tissue.



B) Slide method:

A more rapid and simple method in which a drop of plasma is added to suspension of Staphylococci on glass slide, visible clumping indicates the presence of coagulase.



Nasal swab

Nasopharyngeal swab



Procedure:-

- 1 – take a nasal swab from your friend by using a sterile cotton swab .
- 2 – culture the nasal swab on (Mannitol Salt agar) medium plate.
- 3 – Incubate the plates in incubator with 37°C for 24 hours.
- 4 – examine the plates and diagnose the suspected bacteria and differentiate between them.

Name of suspected bacteria	Hemolysis	Pigments of colonies	Mannitol fermentation	Coagulase
<i>S. aureus</i>	+ve	Golden	+ve (yellow colonies)	+ve
<i>S. epidermidis</i>	-ve	White	-ve (remain the colour of medium clear orange)	-ve