Your Name

Instructor Name

Course Number

Date

Title: Staphylococcus epidermidis

**Introduction**

Staphylococcus epidermidis is a gram-positive bacterium and its cell wall consists of teichoic acid that is formed by glucose, polymerized glycerol, and N-acetyl glucosamine. This bacterium grows very well in aerobic conditions and it grows firmly in a medium that is 10 percent saline. S.epidermidis colonize the skin of human being and is mostly detected in the dental plaque and saliva. It is mostly associated with periodontitis., dry socket, and stomatitis. This bacterium is sensitive to novobiocin (Vuong and Otto).

 S. epidermidisa’s is a very opportunist pathogen and makes a major breach in the defense system of the host. It can cause nosocomial infection and is linked with foreign infection in the body. The suspectable individual is the drug users, elderly, newborn and those who are using artificial appliances and cathedrals (Jetten and Vogels).

  S. epidermidisa’s colonies are raised, round, shiny and have full edges. Theses colonies have a diameter of 2.5mm approximately. They do not make any hemolytic zone thus they do not produce mucus that is present in sticky translucent colonies of bacteria. The organism produces a very thin layer which results in the formation of hydrophobic biofilm. The biofilm is formed by polysaccharide intracellular adhesin and the polysaccharide capsule and both are these are coded in the gene icaADBC. Another virulence factor of this bacterium is that it has fibrinogen binding (Jetten and Vogels).

The gene named as fbe codes for the protein that is a frame of 3,276 nucleotides. The promoting adhesin of the host cell and Fibrinogen contains in the plasma component of the bacterium (Jetten and Vogels).

**Materials and methods of the tests being conducted**

Gram stain:

Is used to differentiate between gram positive and negative bacterium by coloring them.

Material:

A sample of the bacterium was used and then the culture was evaluated (Gram Stain).

Gelatin Hydrolysis

Gelatin Hydrolysis is used to check the  ability of microorganism that produces proteolytic enzymes. Several methods are used for the production of gelatin substrate. A very heavy inoculum was used that contains 18-24 years old bacterium and were stabbed less than one inch on the tube that contains nutrient gelatin. The test tube was incubated and the optimum growth temperature of the bacterium was kept as 35°C. the tube was removed daily from the incubator and was kept in the refrigerator for 15-30 minutes. The tube is then observed to check whether gelatin was hydrolyzed (tankeshwar).

Fermentation Carbohydrate:

 The aim of this test is to govern the capability of bacteria to ferment some type of carbohydrate. In the test, acid phenol red was used to check the acid production and to collect the gases a Durham tube was fixed in the tube. The utilization of sucrose and lactose by the bacteria require the release of hydrolytic enzyme. Thus, the bacterium by the resulting formation of monosaccharide (Lammert).

Procedure:

 The tube that contained phenyl red was being labeled by the name of the bacterium used. Then hen the phenol red was inoculated with the help of aseptic technique and the tube was incubated at 35°C for a day and then the tube was examined for the acid production. Gas bubbles were collected with the help of Durham tube and then the tube was discarded for sterilization (Lammert).

Materials:

Phenol red tube, Durham tube that contained lactose, glucose, sucrose, and fructose were used. Pure culture of the bacteria was also used in the procedure that was kept in broth culture (Lammert).

**Methyl red:**

 This test is used identify the behaviors of some bacterium to ferment glucose with the help of mixed acid fermentation  (Lammert).

Materials used:

Methyl red broth tube was used and a pure beactirum culture was used. A pH indicator used in the test was the methyl red which was kept in a bottle with a bulb and a Pasteur tube (Lammert).

Procedure:

 The MR-VP broth tube was labeled with the bacterium name, our names and the date were also mentioned. MR-VP broth was inoculated with aseptic technique and the culture of the bacterium was used on the tube. Then the incubated tube was reserved at a temperature of 35°C for 48 hours. Methyl red was added in the tube after incubation and the Ph indicator and the broth culture were stirred gently to mix them up. The reaction was noted and red culture indicated a assorted acid fermentation while a yellowish or orangish color was for the negative test (Lammert).

**Voges-Proskauer test:**

The aim of this test is to find out the capability of bacterium to ferment glucose by the help of butanediol fermentation (Lammert).

Material used:

Methyl red and pure culture of bacterium on an agar slant was used. Barritts reagent A and B both were used (Lammert).

Procedure:

The MR-VP broth tube was labeled with the bacterium name and the tube was incubated with the help of the aseptic method. Then it was kept for up to 48 hours in 35°C temperature and after incubation 5 drops of Barrett’s agent B was put in the tube and 15 droplets of Barritt reagent A.Then the tube was fixed in a rake for almost half an hour and the result was checked. The tube was discarded then for sterilization (Lammert).

**Citrate Utilization:**

The purpose of this test is to check the utilization of citrate by a bacterium and to determine its main source of energy and carbon (Lammert).

Materials:

Simmons citrate agar slant tube and pure culture of agar slant bacterium and broth tube was used(Lammert).

Procedure;

 The tube was labeled with the name of the group and the bacterium then aseptic technique was followed to incubate it. The temperate was 3 kept up to 35°C for 4 days and then then the slant was examined each day to check the changes in color.

**Indole test:**

This test was done to check the skills of some bacteria to divide aminoacidic tryptophan into pyruvic acid and indole (Lammert).

Materials:

Tryptone broth tube was used along with the pure culture of the bacterium. A dropper bottle of Kovac's reagent and disposable gloves were used (Lammert).

Procedure:

 The tube was marked with the name of the bacterium and was incubated at a temperature of 35°C for max 48 hours. Then 5 drops of Kovac’s reagent was put in the culture and it was examined (Lammert).

**Hydrogen Sulfide production test:**

 Materials:

Deep tobe of peptone iron was used with pure culture of bacterium (Lammert).

Procedure:

After labeling and incubating the culture up to 7 days at a temperature of 35°C and the blackening of the culture was examined (Lammert).

**Catalase test:**

Materials:

3% of H202 solution was used with a bulb and Pasteur peptide. Then a pure culture of the bacterium was ten on an agar surface along with a sterile stick and microscope slides (Lammert).

Procedure:

Pasteur peptide solution containing 3% of H202 was dropped on the culture of the bacterium and then the appearance of the bubble was examined (Lammert).

**Nitrated reduction:**

Materials:

Nitrate broth, Pasteur peptide , nitrate reagent A and B, and rubber bulb Were used. Powdered zinc and a wooden stick along with the culture of the bacterium were used (Lammert).

Procedure;

 The name of the bacterium w3as wriiten on the tube and it was then incubated for 24-28 hours in a temperature of 35°C and then 5 drops of reagent A and B was dropped in the culture to check the changes in color (Lammert).

**Litmus milk reaction:**

Litmus milk tube and pure culture of the bacterium was used (Lammert).

Procedure:

After labeling the tube with the name of bacterium it was incubated up to 7 days at a temperature of 35°C. the litmus milk reaction was checked every day and tubes were discarded for sterilization (Lammert).

**Motility test:**

Materials:

 Motility test medium tube was used with an inoculating needle with a wire and pure culture of bacterium (Lammert).

**Procedure:**

After labeling the tube a sterile inoculating needle was put in the culture to get a small inoculum, then the bacterium was kept in the midpoint of the medium up to the depth of three quarters. The tube was examined for bacterial growth and the mobility was checked for 48 hours (Lammert).

Works Cited

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