**Introductory Medical Microbiology**

**Laboratory Notes**

**BIOL 2161L**

# CATALASE TEST

Catalase is an enzyme that decomposes hydrogen peroxide into oxygen and water.  Excluding the *Streptococci*, most aerobic and facultative anaerobic bacteria possess catalytic activity.

**Methodology**Hydrogen peroxide forms as one of the oxidative end products of aerobic carbohydrate metabolism.  Catalase converts hydrogen peroxide into water and oxygen.  The catalase test is commonly used to differentiate streptococci (negative) for staphylococci (positive).

**Specimen Requirements**Well -isolated colonies of an 18-24 hour culture.

**Reagents and Equipment**

3% Hydrogen peroxide, Clean glass slide, Dropper, Bacteriological Loop

**Controls**Positive:  *Staphylococcus aureus*  
Negative:  *Streptococcus sp.*

**Procedure:**1. With loop or applicator stick, transfer cells from the center of a well-isolated colony to a glass slide.  
2. Add 1-2 drops of the 3% Hydrogen peroxide to the bacterial cells  
      *Note:  It is recommended to use this order instead of adding the organism to the reagent,  
         particularly if iron containing loops are used, due to false positives*

**Interpretation**Positive: rapid, appearance of sustained gas bubbles  
Negative:  No gas bubble production

# COAGULASE TEST

**Coagulase** catalyzes the conversion of fibrinogen to fibrin in blood plasma.  The network of fibrin formed in host tissue infected with  coagulase  producing organisms serves to protect the bacterium from the defenses of the host.  This characteristic is a primary indicator of virulence among staphylococci. This test can be used to differentiate *Staphylococcus aureus* from *Staphylococcus* epidermidis as well as streptococcus organisms.  Coagulation within 24 hours is indicative of *Staphylococcus aureus.*

**Materials**              Well-isolated colonies, Citrated rabbit plasma (1:4 dilution), Pipettes, Small test tubes

**Procedure**1. Heavily inoculate a tube containing 0.5 ml rabbit plasma with your unknown organism.  
2. Incubate the mixture at 37degrees C .  
3. Examine the plasma tube for coagulation by gently tilting the tube.  
4. Observe tube(s) at 0.5, 1, 2, and 4-hour intervals.  
*Note:  If tube has not clotted after 4 hours, then incubate for 24 hours and then read.*

**Interpretation**Positive:  *Staphylococcus aureus*  
Negative:  *Staphylococcus epidermidis*, *Streptococcus sp.*