Field Microbiology for Feedlot Cattle

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Abstract

Bacteriology is a useful diagnostic and treatment regimen management tool. The perceived difficulty, complexity and expense cause many veterinary practitioners to avoid diagnostic microbiology in their office laboratory. In reality, targeting diagnostic microbiology to the diseases affecting animals in specific production management systems decreases the complexity needed to provide useful microbiology information. It also simplifies the interpretation of culture and biochemical test results. This paper presents a simple diagnostic microbiology system targeted at feeder cattle that can augment production management consulting services. Supply sources, maximizing supply shelf-life, and building an inexpensive culture incubator is included.

Introduction

Bacteriology may not be simple, but it is worth reminding yourself of a few basic techniques. Starting cultures in the field improves the turnaround and can improve the accuracy of diagnosis of some diseases.

Equipment

Sterile syringes and needles: 10 cc syringes and 20-gage, 1.5-inch needles for collecting needle aspirates and for inoculating agar plates.

Butane lighter: Use a butane lighter for sterilizing aspiration needle before using needle to streak agar plate.

Culture materials: oxidase and indole reagent droppers: BBL #4361181/4361185 ($35 per 50 droppers) blood, MacConkey, & TSI: Physician Lab Supply #1014/1006/6032 ($3.10 to $3.40 per 10), Poly O Antiserum: BBL #40707 ($46 per 2 ml, one drop per test)

The Procedure

As I identify target tissues for culture, I take aspirates from those tissues using a 10cc syringe and 1.5" 20 gage needle. After the necropsy, spray the aspirate on blood agar plates. Next, bend the 1.5" needle in a 45 degree angle and flame until sterile. Use the bent needle to streak the agar plate. Tape the edges of the agar plate. Double bag the plate and it is ready for shipping to diagnostic laboratory.

For on-site identification, use the included chart (Figure 1 on next page). You will need the following identification tests: 3% potassium hydroxide gram's, oxidase, indole, hydrogen peroxide and the *Salmonella* Poly O antiserum. An incubator can be made from an aquarium heater, light socket, thermometer, and ice chest (see Figure 2 on next page).

GROUP I: Growth on Blood and MacConkey Agar (GRAM -).

Red ← Colony Color → Colorless

E. coli
(TSI= A/A, gas,-H2S)
(oxidase -)
(indole +)

Salmonella
(TSI=K/A, gas, +/- H2S)
(oxidase -)
(indole -)

Hemophilus s= (CO2)
(TSI = NC)
(oxidase +)
(catalase + swine, - cattle)
(Indole -)

GROUP II: Growth on Blood and poor or delayed growth on MacConkey Agar (GRAM -)

Variable color: *Pasteurella* sp. (TSI = A/Aw)
(oxidase +)
(catalase +)
(indole = m+, h-)

GROUP III: Growth on Blood and no growth (GRAM +) on MacConkey agar.

(+) Catalase (-)

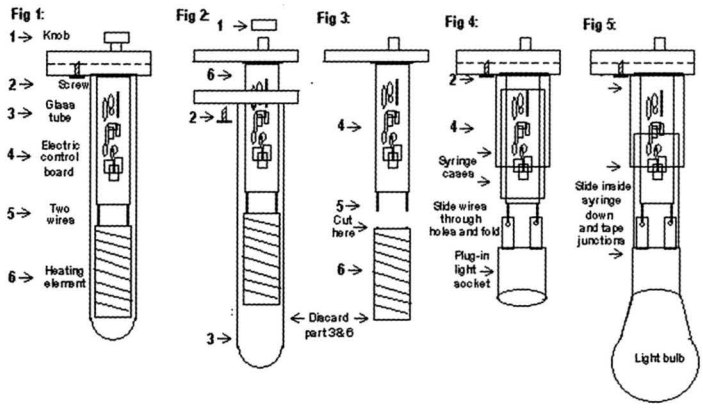
Staphylococcus sp.
(cocci/grapes)

Streptococcus sp.
(cocci/chains)

Actinomyces pyogenes
(TSI = NC) (rods/letters)

K = alk, A = acid, w = weak
Gram's reaction: stringy on 3% KOH = gram (-), no reaction = gram (+)
Oxidase and Indole: color test (purple/dark blue) on white tissue paper (recheck at 48 hrs)
Catalase: bubbles on 0.3% H2O2
TSI (Triple Sugar Iron) = (K=alk, A=acid w=weak, NC=no change)
Salmonella Poly O antiserum: agglutination = (+)

Figure 1. Bacterial identification chart.



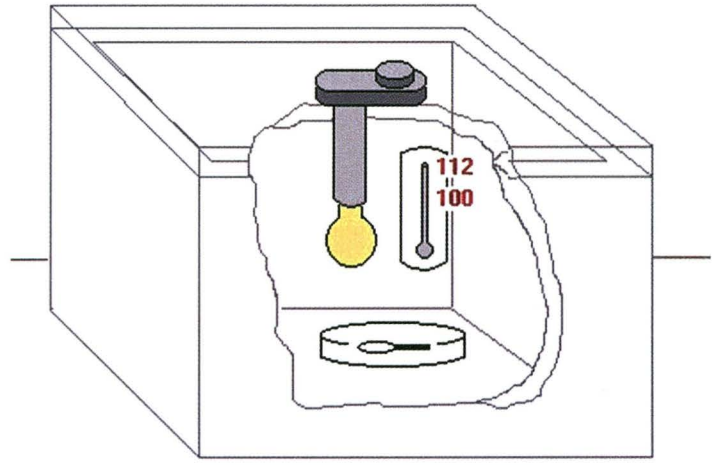


Figure 2. Incubator for field microbiology.