MISSISSIPPI STATE UNIVERSITY EXTENSION

Using an On-Farm Bacteriological Culture System

Mastitis is the result of an udder infection, typically caused by bacteria invading the teat end. Not only is it the most expensive disease on a dairy farm, but it can also be difficult to detect and treat. Identifying specific mastitis pathogens can help a producer tailor treatment and management decisions for each mastitis case. However, sending samples to a laboratory can be expensive and typically requires a week to obtain results.

The Minnesota Easy™ Culture System helps producers identify pathogens based on which of the three agars the bacteria grows. This system is easy to use, provides results within 24 hours, and costs about $3.50 per sample. This publication will help producers understand how to streak samples in order to grow bacteria for identification using this system.

Note: Please refer to MSU Extension Publication 3124 Collecting Milk Samples for Microbiological Analysis and Publication 3141 Reading On-Farm Bacteriological Culture Results for tips on collecting aseptic samples and reading the results properly.

Materials Needed

- Incubator
- Sterile swabs, 1 per milk sample
- Tri-plates, 1 per milk sample
- Permanent marker
- Clean table or desk

Adapting an Egg Incubator

Inexpensive egg incubators can be easily adapted for on-farm bacteriological culturing of samples. However, it is important to select an appropriate model. Temperature control is imperative, so make sure the incubator can reach and hold a temperature of 99°F. Purchase a unit without an automatic egg turner, or remove this element if it is present. Use a still-air incubator instead of a circulating-air system to prevent outside bacteria from entering the unit. Although it is possible to adapt a used incubator, it is best to use a new incubator to decrease the likelihood of contaminating plates.

Several options are available for incubators, and they range in price from about $50 to $100. Once you have selected an incubator, place it in a room away from direct sunlight and manure. Heat the incubator for 24 hours before you use it to make sure it holds the temperature stable at 99°F. You may not use the incubator every day, but it may be helpful to keep it turned on and ready.

Conclusion

On-farm bacteriological culturing allows farmers to identify specific mastitis pathogens and determine the most effective treatment method (including no treatment and culling). It also can be used to make management changes based on herd-level results. You get results faster, and it is less expensive than sending samples to a laboratory. With only a few inexpensive supplies and a few minutes for each mastitis case of interest, dairy producers can identify specific mastitis pathogens within 24 hours. Discuss these results with a veterinarian to develop specific treatment plans for each cow.

Procedure

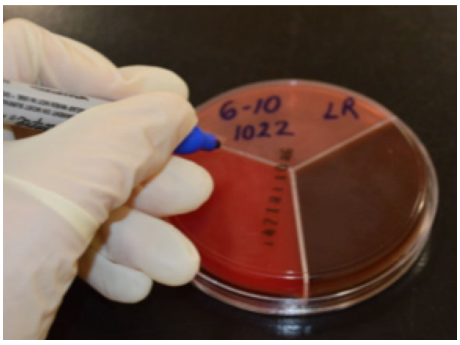

Figure 1. Label a tri-plate with the date, cow number, and quarter from which the sample was obtained. Write on the bottom of the plate, not the lid, as the lids can easily be mismatched when they are removed.

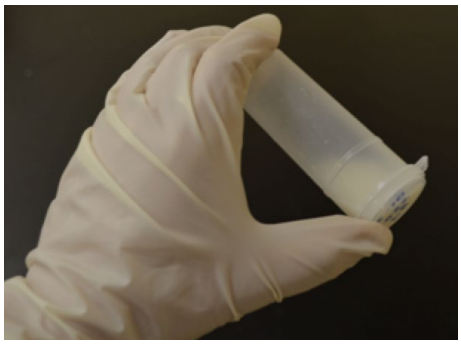

Figure 2. Close the lid and gently rotate or invert the milk vial several times.

Figure 3. Open the lid and dip a new swab into the milk sample, being careful not to touch the swab against anything but the milk. Immediately close the vial lid after you dip the swab.

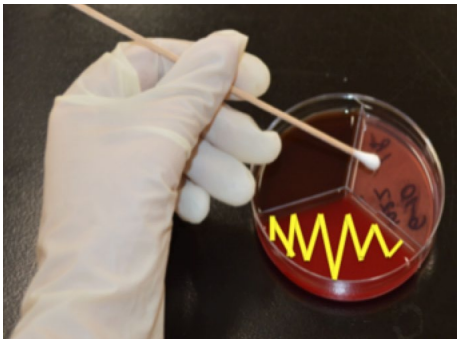

Figure 4. Gently rub the swab on the surface of one agar section in a zigzag pattern similar to the picture above. Try to avoid pushing the swab deeply into the agar material. Keep all lids closed when not actively streaking samples, and avoid placing clean materials like swabs on table surfaces.

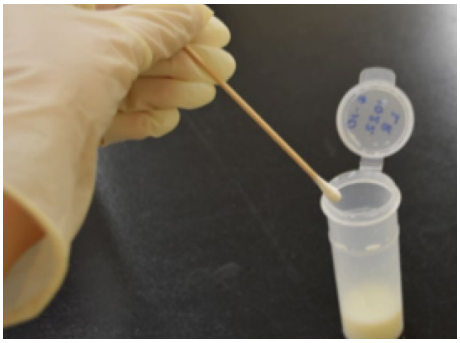

Figure 5. Re-dip the swab in the milk vial, and repeat step 4 for the remaining agar sections. The same swab can be used for all three agar sections, but discard it after all three sections are streaked.

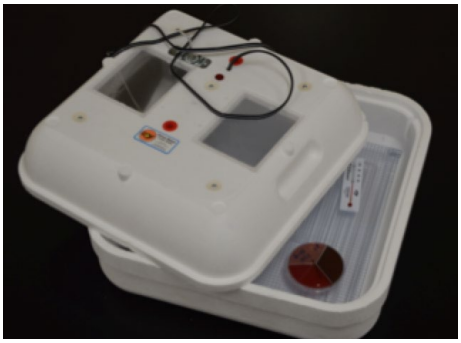

Figure 6. Place the lid back on the tri-plate and place it upside-down in the egg incubator for 24 hours. Turning the plate upside down (so that the agar is on top and the lid is on bottom) will help prevent condensation from flooding the agar, which can prevent bacterial growth.

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