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Biofilms-Your Biological Foe



Photo credit: S. Mills-Lloyd

Biofilms are all around us. If you have ever had a dental cavity, you have experienced the effect of a biofilm.

Biofilms are defined as microbial growth on a solid surface. Bacteria, viruses, and protozoa are microbes as they cannot be seen without the help of a microscope. Many of the microbes which live in a biofilm can be a potential disease concern for calves.


In order for these organisms to live, they need nutrients in the form of carbohydrates and proteins. On the farm we have a great source of nutrition to sustain biofilm growth—milk or milk replacer. Biofilms form for a variety of reasons, but we will look at two main reasons—improper cleaning to remove the milk/milk replacer residue and imperfections in calf feeding equipment.

Removal of milk/milk replacer residue in feeding pails, bottles, nipples, and other feeding equipment is important. The following is a calf feeding equipment cleaning protocol as recommended by Donald Sockett, DVM, Wisconsin Veterinary Diagnostic pathologist:

1. Rinse using warm, 90 degrees F water.
2. Soak in hot water, greater than 130 degrees F, with 1 percent chlorinated alkaline detergent.
3. Wash water should be greater than 145 degrees F. Using a brush will help eliminate any other residue.

4. Rinse using cold water solution that contains 50 parts per million of chlorine dioxide.
5. Dry by letting the equipment drain and dry completely before re-use to prevent the growth of bacteria.
6. Final preparation of equipment should include spraying the inside and outside of calf equipment with a 50 parts per million chlorine dioxide solution two or less hours before the next use.

Imperfections in the form of scratches on the surface of calf feeding equipment happen most frequently on any surface made from plastic or rubber. These imperfections lead to the potential for disease causing microbes (bacteria and viruses) to live. Plastic is easily scratched by the teeth of calves chewing on the pail, a stiff-bristled brush, or stacking pails. Rubber naturally breaks down over time and is accelerated by using harsh cleaners or disinfectants. The following are ideas to reduce the ability of microbe growth:

- Place pails upside down on a drying rack instead of stacking inside each other
- Purchase a soft-bristled brush instead of a stiff-bristled brush for cleaning
- Use stainless steel calf feeding equipment instead of plastic
- Develop a schedule for replacing equipment made of plastic or rubber—mainly calf feeding pails and bottle nipples 

Authored by:

Sarah Mills-Lloyd
Agriculture Agent
UW-Extension
Oconto Co

920.934.6845
sarah_millsloyd@uwex.edu

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