

Cattle Gut Microbe Series: Lactobacillus species

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The ruminant is a fascinating animal because it can convert feed and forage into energy and microbial protein thanks to the activity of its gut microbial community, such as bacteria. The microbes of the rumen and lower gut have a large impact on the performance and health of their host animal. Many of these microbes are beneficial to cattle. However, other microbes may be pathogenic and cause harm. Optimizing management strategies to improve performance and animal health monitoring relies on an understanding of these key microbes in the digestive tract, and how they may impact your operation. This first publication in the Cattle Gut Microbes Series will introduce and discuss microbes, or groups of microbes, that are important to cattle production.

Overview

Lactobacillus microbes are abundant and influential in the rumen of cattle. *Lactobacillus* species are rod-shaped, gram-positive bacteria that produce lactic acid. Depending on the situation, *Lactobacillus* microbes can be both beneficial and/or harmful to cattle performance.



Ruminants are adapted to utilize predominantly forage-based diets; however, growth and milk production are considerably increased when they consume high-grain supplements in addition to roughage. Ruminal abundances of *Lactobacillus* species are greater in cattle fed a high-grain diet.

Figure 1. Image of *Lactobacillus* organisms. Image modified and courtesy of SciMAT/Photo Researchers, Inc.

Lactic acid producing bacteria, such as *Lactobacillus* species, can grow quickly in the rumen under conditions of low pH caused by high-grain diets. Lactic acid production happens quickly in this situation, lowering the rumen pH even more and ultimately leading to health complications such as acidosis. The pH issue can continue to worsen, creating a rumen environment more selective for lactic acid-producing bacteria.

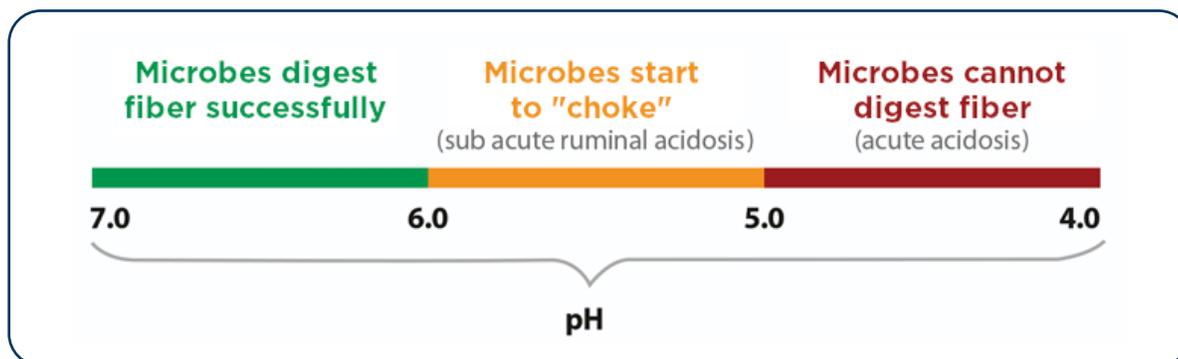
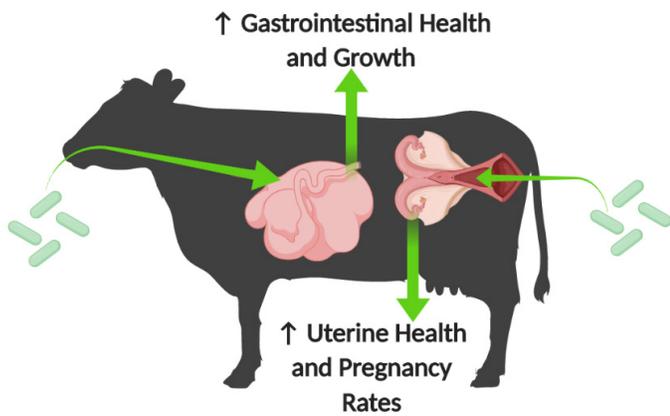


Figure 2. pH issues in acidosis. Image adapted from ruminantdigestivesystem.com.

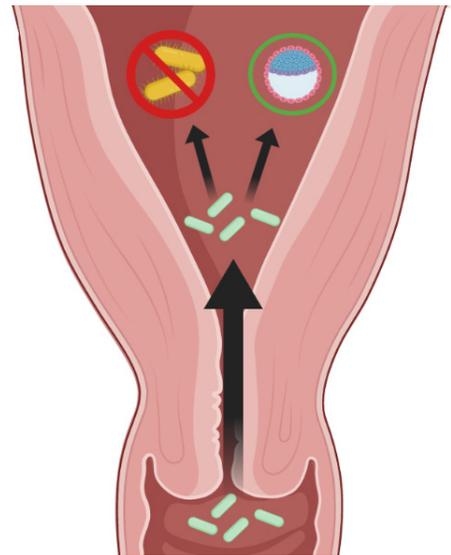


On the other end of the spectrum, some *Lactobacillus* species are commonly used as probiotics in human foods and animal feed. Research has demonstrated that *Lactobacillus* species can provide some protection against intestinal infection.

Figure 3. *Lactobacillus* species, as a probiotic, delivered through feed or into the reproductive tract can improve production outcomes. Image created in BioRender.

Beyond the rumen, although highly dominant and indicative of a healthy reproductive tract in humans, *Lactobacillus* abundance is low in the bovine reproductive tract; however, recent studies suggest the administration of *Lactobacillus* to the vagina of cows prior to calving may decrease the prevalence of postpartum metritis [1,2].

Figure 4. *Lactobacillus* species administered into the vagina eliminates pathogens and may benefit a potential pregnancy by improving the uterine environment. Image created in BioRender.



What does this mean for me?

In many ways, lactic acid-producing bacteria such as *Lactobacillus* species, contribute to the health and well-being of the ruminant. They have been shown (but are not limited) to:

- Contribute to ruminal acidosis.
- Stabilize digestion and gut health.
- Alleviate some disease occurrence.

Understanding how these bacteria impact cattle production can help beef cattle producers improve disease management and production efficiency in their herds. For example, this can be informational to diagnose a problem, such as when an animal goes off feed.

If you have any further questions about microbes in your cattle operation, please contact Phillip Myer or visit rumenmicrobes.utk.edu. As always, consult with your county UT Extension agent for more information.

References

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