The world has now been in the antibiotic era for over seventy years. These medications have revolutionized health care, with the number of human lives saved by penicillin alone numbering in the millions. However, with widespread emergence of antibiotic resistant infections, we are now experiencing the effects of their overuse in medicine, agriculture and industry. Consequently, the FDA has taken steps to change how medically important antibiotics are used in the water and feed of food producing animals by the Veterinary Feed Directive (VFD). The VFD took effect on midnight January 1, 2017. Farmers can no longer use medicated feed containing “medically important” antibiotics (those vital to human medicine) without a veterinarian’s oversight and prescription. In addition, medically important antibiotics can no longer be used as growth promoters.

Veterinarians and producers are looking for non-antibiotic solutions to prevent animal disease especially in pre-weaned dairy/beef calves, transition dairy cows, incoming feedlot cattle and any animal that is under stress. Animal stress can be caused by numerous factors such as: heat stress, environmental stress (air, space and water), feed changes and the presence of mold, mycotoxins and spoilage organisms in feeds.

It is generally known that the gastrointestinal tract in humans and animals is an important first line of defense against disease and pathogens. In humans, it is estimated that between 500 to 10,000 different species of bacteria live in the gastrointestinal tract which is one of the most bacteria dense environments in the world. Researchers describe the intestinal bacteria as being both our best friends and our worst enemies. As a rule, the immune system, working closely with the bacterial community in the gut, restricts the expansion and growth of potential disease causing bacteria (pathogens). An overwhelming challenge against the host animal’s immune system, however may lead to bacterial overgrowth and clinical infection. It is important to note that an immune challenge is not always microbial; it could originate from nutrient deficiencies, mycotoxins or a demanding animal environment. Microbiology now defines the microorganisms that inhabit the G.I. tract as the microbiota.

Tri-Lution® is a direct-fed microbial that contains probiotic live yeast and bacteria and other synbiotic ingredients that help the G.I. tract of livestock (Dairy, Beef, Swine and Poultry) maintain a healthy G.I. tract microbiota and minimize the effects of disease causing pathogens. Agri-King’s R & D Department is using new lab techniques to both better understand the effects of Tri-Lution® on the G.I. tract microbiota and make it even better. For more than 15 years, Agri-King’s field

**Figure 1: Day 7 Fecal Microbiology-Calves Fed Milk Replacer with Tri-Lution**

![Clostridia CFU/g DM](image-url)

<table>
<thead>
<tr>
<th>Clostridia CFU/g DM</th>
<th>Control</th>
<th>Tri-Lution 5 Billion CFU</th>
<th>Tri-Lution 10 Billion CFU</th>
</tr>
</thead>
<tbody>
<tr>
<td>38,221</td>
<td>18,993</td>
<td>6539</td>
<td></td>
</tr>
</tbody>
</table>

 Linear 

$P=0.08$
experience and research supports Tri-Lution®’s ability to strengthen the immune response, increase microbial diversity and support beneficial microbiota.

Including Tri-Lution® in milk replacer for Holstein bull calves reduced the fecal shedding of potentially pathogenic clostridia (see Figure 1). Recently, Courtney Furst (Agri-King Area Manager and co-author of this article) was able to demonstrate Tri-Lution®’s effect on a 12-year-old high genetic merit cow infected with mastitis. Antibiotic therapy was not considered feasible given the severity of the infection and milk withdrawal period (see CMT Day 1). Tri-Lution® was fed at a rate of 3 oz. (.18 lbs) to this cow with no other treatment given. By Days 2 and 3, there were no marked changes in the cow’s hot quarter, however two quarters showed improvements (see CMT’s Days 2 & 3). On Day 4, there were marked improvements in all quarters and eventually the cow fully recovered (see CMT Day 4).

The use of Tri-Lution® on a larger scale has been equally successful. A large Upper Midwest dairy had issues with elevated SCC between 400-500 cells/ml during the summer months of 2014 (see green line in Figure 2). The causative organism was not susceptible to conventional antibiotic therapy. Tri-Lution® was added to the milk cow rations starting August 2014 (see blue line in Figure 2) resulting in a decline in SCC. Tri-Lution® was continued in their milk cow rations the following year in 2015 and SCC stayed lower during the summer months (see yellow line in Figure 2).

The use of Tri-Lution® has also been used successfully in other livestock species such as beef, swine and poultry in reducing sickness and death loss and improving feed conversion. With implementation of the Veterinary Feed Directive (VFD) alternatives to antibiotics will be desirable. Contact your Agri-King Area Manager today regarding how Tri-Lution® can be used in your livestock operation. AK