

Northwest Veterinary Associates Newsletter

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By Dr. Kokaram

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Recently, I have been approached by a few of our clients with questions concerning how direct-fed microbials or probiotics might be able to be incorporated into their calf diets. With the discontinuation of medicated milk replacers, many companies and farmers have begun to look at direct-fed microbials as potential means for providing some stability to the juvenile digestive system of the calf. In the October 2010 issue of Hoards Dairyman, there was an interesting summary of the available research data presented at that year's Dairy Nutrition Conference that suggested that in comparison to medicated milk replacers, replacers containing microbial agents have comparable rates of scours overall. So what exactly are direct-fed microbials?

Direct-fed microbials or probiotics are feed additives that contain live bugs (bacteria and/or yeast) that are considered to be part of the normal gut environment of the calf or cow. These are designed to benefit the cow or calf through enhancing the microbial balance of the gut. Some of these probiotics are a mixture of bacteria, yeast and other fungi. This is as opposed to prebiotics which are compounds designed to promote the growth of gut bacteria. These supplements work by providing the nutrients these bacteria require for growth that may be lacking in the diet of the cow or calf at that time but are not living entities. So what's the deal with these products though?

Normal gut bacteria colonize the intestines of the calf within the first couple days of life. During normal gut activity, these bacteria produce essential acids that inhibit the growth of potential disease causing bacteria. In addition to altering the pH of the gut, some additionally produce secretions that themselves inhibit bacterial growth or may improve the strength of the gut lining and help strengthen the immune system by direct interactions. Stress from weaning, transport, handling, diet or weather changes, overt antimicrobial usage, can all negatively influence the normal environment of the gut leading to impaired digestion (scours), and thereafter, a suppressed immune system.

So with all of these good effects of probiotics, one would assume that they would be included in calf feeds at a higher rates. However, various studies performed in calves have shown mixed results in terms of effects upon gut health. While there are many that show enhanced growth rates and decreased incidence of scours especially in the face of stress and disease exposure, there are quite a few that show no real significant improvement in growth rates and fecal scores and shedding. Overall though, the majority of the studies do suggest an enhanced animal performance (increased weight gain, efficiency) if only in young, milk fed calves. The best usage of these probiotics may perhaps be in situations where calves are exposed to immune or management challenges that may be disruptive to the intestinal environment. "Can I feed this stuff to my cows doc?"

Research presented in a January 2003 issue of the Journal of Dairy Science demonstrated a significant improvement in dry matter intakes and milk production in cows fed direct-fed microbials. Within the first 7-21 days in milk, cows fed a ration containing direct-fed microbials in the pre- and post-fresh groups consumed significantly more pounds of feed and produced more milk during that time frame as well when compared to cows that were not fed a ration containing direct-fed microbial agents. Interestingly, the cows fed direct-fed microbials only in the post-fresh groups did perform comparably to those fed these microbial agents in both the pre- and post-fresh groups. So from this study one would have to be encouraged that there would be an advantage to the use of these probiotics in the dairy cow rations.

Applications of these agents on-farm though, can be somewhat challenging however. The majority of those targeted at calves are marketed as additives to be included with the milk replacer or milk just prior to feeding or as a gel, paste or bolus. Overall considerations that ought to be evaluated would be the temperature and environmental conditions where it is stored, the concurrent use of antimicrobials, the mineral composition and temperature of the water supply and the specific strain of microbial that was included in the mix for the farm. Conditions that can kill direct-fed microbials include storage for long periods, temperature extremes, direct sun, high humidity, oxygen, presence of mineral premixes, and others. Over time, organisms will die and product effectiveness will be lost. Concurrent feeding of antimicrobials such as ionophores (Bovatec and Rumensin) may influence the effectiveness of direct-fed microbials.

Overall, feeding direct-fed microbials in the milk or milk replacer can have a positive influence upon gut health (specifically with regards to reduction in the incidence of scours) and overall health status of calves. However, the greatest benefit may arise from its use in situations where there is increased chance of stress or conditions that may be suppressive of the immune system of the calf. As far as cows, from the limited studies that have been done, there does appear to be a positive effect of its use upon feed intake and efficiency and milk production. With the discontinuation of medicated milk replacers and overall increased scrutiny of drug residue violations, the use of these probiotics would be a step in the right direction to achieving the desired health benefits without the need for antibiotics in the feed, etc.