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JUL 2015

The Colostrum Counsel

Use of antibiotics in agriculture is an added cost to the producer and growing concern to consumers. Feeding a colostrum replacer product may reduce the need for antibiotic treatments in pre-weaned calves.

Use of Colostrum Replacement products as an alternative to reduce antibiotic treatment in pre-weaned dairy calves

The increased concern of modern societies on the emergence of antibiotic-resistance bacteria has led to regulatory institutions to limit to a minimum the number of antibiotics that can be used in food producing animals for therapeutic and preventive treatment of infectious diseases. The sometimes unreasonable use of antimicrobials in beef and dairy operations could result in potential adverse effects on human health as the risk of transmission of resistant microorganisms to the human population could potentially increase [Silbergeld et al. 2008]. Prophylactic and methaphylactic administration of antibiotics to prevent disease in calves early after arrival to feedlots and dairy calf ranches is not uncommon. At the same time as overuse of antibiotics is evident in some situations, the discovery and development of new antimicrobials to treat old and novel infections in human and veterinary medicine has decreased in the last years. It is estimated that the antibiotic shortage increased around 283% during 2006 and 2010 [Stanton 2013; Borchardt and Rolston 2013].

To overcome the limited availability of antibiotics to treat food producing animals and at the same time the high morbidity and mortality rates observed in some cattle operations such as feedlots and dairy calf rearing farms, the development of alternatives to antibiotics such as antibacterial vaccines, immunomodulatory agents, and antimicrobial peptides (AMPs) have been proposed [Seal et al. 2013]. Maternal colostrum provides specific immunity to the newborn calf through immunoglobulins (IgG) that effectively protect against infectious microorganisms during the first weeks of life. In addition to IgG, maternal colostrum provides high concentrations of immunomodulatory factors (cytokines), antibacterial peptides (Lactoferrin), growth factors (EGF, IGF-1), and vitamins that enhance immune responses and exert antimicrobial functions in the young calf [Hagiwara et al. 2000; Yamanaka et al. 2003]. Colostrum intake in newborn calves should occur immediately after birth because the ability of the calf intestine to absorb IgG decreases progressively after 6 hours of life. Calves with adequate passive transfer of IgG during the first 24 hours of life demonstrate lower morbidity and mortality rates compared with calves with failure of

passive transfer of IgG (FPT) [Berge et al. 2005]; however, the benefits of maternal colostrum components including immunoglobulins (IgG, IgA, IgM), immunomodulatory factors, vitamins, growth factors, and antimicrobial molecules could be prolonged during the pre-weaning period through continuous administration of maternal colostrum in the calf ration. Studies have demonstrated that although absorption of IgG after 24 hours of life does not occur in the calf, the effects of immunoglobulins and other immune factors present in colostrum provide local immunity in the gastrointestinal tract and might prevent infection caused by enteric viruses and bacteria [Snodgrass et al. 1982]. One study demonstrated that when 70 g of a dried colostrum-colostrum replacer product containing 10 g of IgG mixed in the milk replacer ration was administered twice daily from 1 to 14 days of age to dairy calves with partial or complete FPT, the number of days with diarrhea and the number of antibiotic treatments was significantly decreased when compared with a control group of calves with FPT that did not receive colostrum replacer supplement [Berge et al. 2009].

In a more recent trial at SCCL, we administered 150 g of a dried-colostrum-colostrum replacer mixed into the milk replacer twice daily from days 1 to 14 to Holstein calves in a calf ranch and compared the incidence of disease (diarrhea and pneumonia) and total number of antibiotic treatments with a control group of calves that did not receive colostrum replacer supplement in their ration. All calves used in this trial had adequate passive transfer of IgG at the start of the trial (IgG in serum > 10 g/L). The overall incidence of disease in calves supplemented with colostrum replacer was reduced by 40%; additionally, the number of antibiotic treatments in the group of calves that received colostrum replacer was reduced 4 times (Chamorro and Haines 2015, non-published data). It is possible that components present in the dried colostrum-colostrum replacer such as IgG, immune factors, vitamins, and other antimicrobial peptides such as Lactoferrin could have played a role increasing local and systemic immunity in calves receiving supplemental colostrum. The results of these studies suggest that colostrum supplementation of dairy calves during the first 2 weeks of life independently of passive transfer status reduces presentation of disease and minimizes prophylactic and therapeutic use of antibiotics before weaning.

By: Manuel F. Chamorro, DVM, MS, PhD, DACVIM
Director of Technical Services and Clinical Research,
SCCL

Manuel obtained his DVM from the National University of Colombia in 2003. Following four years of private dairy practice in Colombia, Manuel moved to the U. S. to pursue an internship in Food Animal Medicine and Surgery at Kansas State University. After finishing his internship in August 2008, he joined the food animal section of Auburn University as a Resident of Food Animal Internal Medicine. In 2011, Manuel finished a Masters program in BVDV and became board-certified as a Diplomate of the American College of Veterinary Internal Medicine in large animals. He worked as a clinical lecturer in food animal medicine and surgery at the Large Animal Teaching Hospital at Auburn University while finishing his PhD in infectious diseases of cattle with particular emphasis in calf immunology, colostrum-derived immunity, and response to vaccination.

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