

Colostrum supplement trial demonstrates reduced immunity transfer in dairy calves

The Situation

It is well established that 25 to 35% of dairy cows on US dairies must be replaced annually in order to maintain herd size and improve genetics. Quality dairy heifers must therefore be available to replace cows leaving the dairy herd. The cost of raising dairy heifers increases if inadequate management results in a higher than normal morbidity and/or mortality. Colostrum management has a very large impact on dairy calf health due to the fact that calves are born without significant amounts of immunoglobulins (antibodies). Passive transfer is the transfer of immunoglobulins from the cow to the calf and is typically accomplished through colostrum feeding. Failure of passive transfer (FPT) occurs when the level of immunoglobulins G (IgG), which accounts for 85% of immunoglobulins absorbed, in the calf serum is less than 10 g/L indicating that the calf did not absorb an adequate quantity of IgG. Low blood IgG in calves is the result of insufficient colostrum uptake, inadequate intestinal absorption or a combination of both. Early studies conducted with calves have demonstrated that most calves deprived of colostrum develop septicemia (blood infection). The FPT has been associated with increased calf morbidity and mortality as well as reduced growth rate. Furthermore, FPT has been linked with decreased milk production and an increase in culling rate in production dairy cows.

Dairies and calf raising facilities need help to determine and analyze the cost-benefit related to products, techniques, and procedures they use or want to implement at their production units.

Our Response

The University of Idaho teamed with a southern Idaho large dairy calf raising facility to determine the effect of adding a serum derived colostrum supple-



Weighing calves.

ment to maternal colostrum on serum immunoglobulin concentration in calves and on calf health and performance. The trial was designed as a totally randomized design with 30 calves per treatment. Colostrum from several cows was pooled in a single tank, pasteurized and then divided in two batches. Colostrum supplement was added to one of the batches at the recommended dose. The other batch received no supplement. Immediately after birth, calves were weighed and within one hour of birth calves were fed 3.8 L of colostrum (receiving either treated or not treated colostrum). Calves received a second colostrum feeding (2 L) eight hours following the first feeding. All calves were moved to a calf facility and blood samples were taken 24 hours after birth to measure total protein and IgG levels. Calves were evaluated daily by study personnel for mortality and morbidity (e.g., fecal consistency, hydration, respiratory scores). Rectal temperature was obtained from each animal every other day for 30 days. Calves were

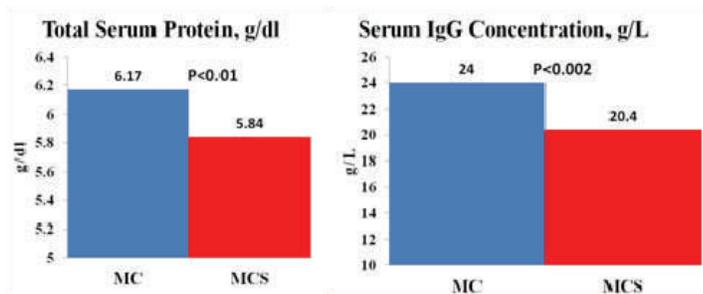
re-weighed at days 28 and 56 and their average daily gain (ADG) was calculated. To avoid bias, the personnel that treated the animals did not know treatment assignments.

Throughout the study, general management, including health care and feeding was the same for all calves. In addition, all calves had constant access to fresh clean water and calf starter from the second day of life.

Program Outcomes

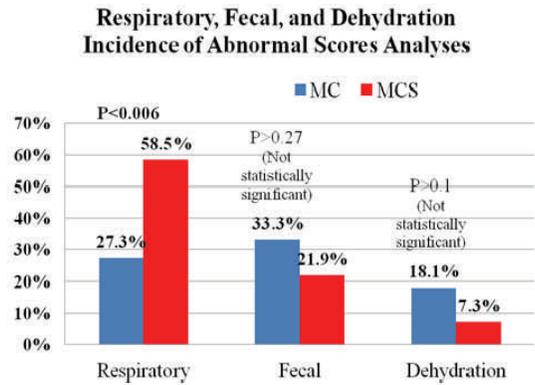
In this study, calves fed Maternal Colostrum (MC) achieved greater levels of Total Serum Protein and IgG than calves fed Maternal Colostrum plus serum colostrum derived supplement (MCS) (Figure 1). In addition, calves fed MC experienced lower incidence of abnormal respiratory scores than calves fed MCS. No statistical difference ($P>0.05$) was found between MC and MCS regarding Fecal and dehydration abnormal Scores (Figure 2) and ADG. The results of this on-farm study demonstrated that in this case, adding colostrum supplement to the maternal colostrum did not achieve any positive effect on performance and health parameters of dairy calves. In consequence, the dairy operators decided to discontinue the use of the colostrum supplement with an annual saving of \$85,262. This type of savings is equivalent to 2.2 average dairy workers' annual salary. In addition, the reduced abnormal respiratory scores and higher IgG absorption are expected to reduce the overall veterinary bill of the dairy. Calves included in this study will be followed during their lives as productive cows to determine if there is any noticeable impact in the long term (2+ years).

Figure 1. Total Serum Protein and IgG concentration comparison.



Differences in total serum protein and IgG concentrations are statistically significant, indicating better absorption with maternal colostrum only.

Figure 2. Statistical analysis of abnormal scores.



The results of this study and the protocols used, which can be adopted by any dairy, were presented at the annual Idaho Dairy-men Association Extension Meeting, the American Dairy Science Association Joint Meeting, the Eurovacum meeting in Spain, Europe, and other meetings. Presenting these results has allowed other scientists, dairy operators, veterinarians, and Extension educators to add a new tool to their management practices.

FOR MORE INFORMATION

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