

# Effect of phytogenic supplementation on calf performance

by Mike Watkins, Biomin USA Inc, 2408 Southridge Drive, Denton, TX 76205, USA, Luis Cardo and Tobias Steiner, Biomin Holding GmbH, Industriestrasse 21, 3130 Herzogenburg, Austria.

Every dairyman has heard the comment “Heifers are the future of a dairy farm!” Most of us would agree with it on face value, but it is true only when these resources are properly fed and managed.

The cost of rearing heifers is second only to the feed cost of the milking herd. Therefore, it makes sense to focus on managing the growth of heifers so they are properly developed and capable of entering the milking herd at 24 months of age.

Reducing the age at first calving by three, two, or even one month can have a significant impact on the profitability of the dairy. Managing to reach this goal begins within the first hours of the heifer’s life and continues at every step along the challenging way.

The objectives of this article are to discuss some of the early challenges calves experience and to present the results of trials evaluating a phytogenic (essential oil/botanical) product in a commercial milk replacer on the performance of preweaned calves.

## Pre-weaning management

Calves face many challenges before weaning that can reduce their productivity and, in turn, have a negative impact on farm profitability. The pre-weaning death loss for heifers born alive is 8-10%, and unfortunately, this is considered normal and acceptable on many farms. However, progressive

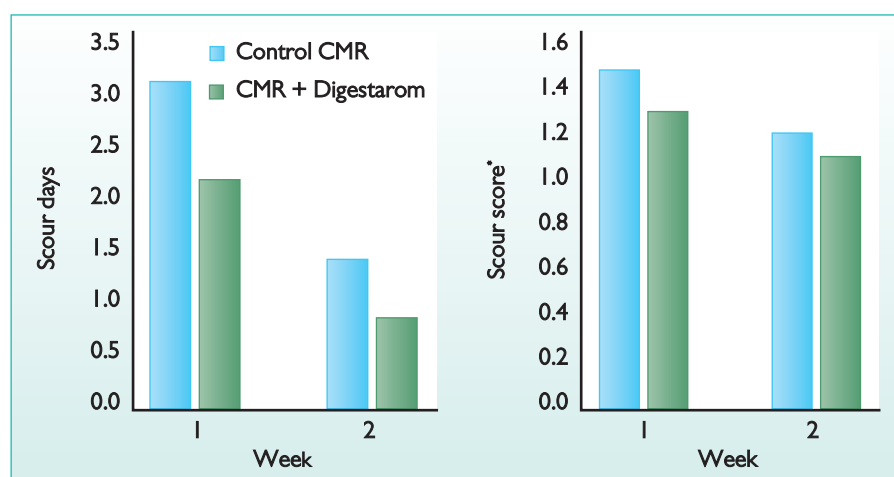


Fig. 1. Scour days and the scour score in calves fed milk replacers with or without a phytogenic feed additive.

dairyman who are better managers achieve losses of 3% or less.

The 2006 NAHMS data indicate that over 75% of preweaned heifer mortality was due to scours, diarrhoea or other digestive problems (56.5%) and respiratory problems (22.5%).

These statistics, which are found in similar frequencies in other countries, make it clear that maintaining a healthy gut environment should receive high priority to keep calves healthy and growing according to plan.

Although respiratory maladies are not directly linked to a healthy gut environment, it is intuitive that a healthier and stronger calf should be much less susceptible to disease and be able to ward off other health altering challenges.

The future productivity of heifers starts by

delivering a sufficient quantity of clean, high quality colostrum in the first hours of life and repeated within the next 10-12 hours post partum. Milk for feeding, like colostrum, be it a reconstituted milk replacer or waste milk on large dairies, must be of sufficient quantity and quality.

The point being that waste milk should be properly pasteurised and milk replacers are handled in a manner that does not introduce pathogens into the mixing vessel or the delivery system before being fed to the calves.

## Art and science

Calf health management is both art and science. Calf care givers must understand calves, recognise behavioural changes and be responsive to changes in the calf’s apparent health condition. At the same time they must have the tools needed to either minimise or respond to health challenge.

In the past only antibiotics were seen as the most viable approach to reducing digestive upsets and maintaining performance. Today, however, many producers are looking to phytogenics (essential oils and botanical products) to maintain calf performance as viable alternatives to antibiotics.

Phytogenic products are not really new

*Continued on page 14*

Table 1. Trial results on the effects of Digestarom Milk on health and performance of calves.

	Control CMR	CMR + Digestarom	Difference (%)
BW gain (kg)	20.6 <sup>a</sup>	22.8 <sup>a</sup>	+10.7
CMR intake (kg; DM-basis)	24.1 <sup>b</sup>	25.0 <sup>a</sup>	+3.7
Starter intake (kg; DM-basis)	20.2	20.9	+3.5
FCR	2.28 <sup>b</sup>	2.10 <sup>a</sup>	-7.9
Scour score*	1.35 <sup>b</sup>	1.22 <sup>a</sup>	-10.0
Scour days	4.53 <sup>b</sup>	3.03 <sup>a</sup>	-33.1

<sup>a,b</sup>P≤0.05 <sup>A,B</sup>P≤0.1 \*Scour score (1-4 scale), 1 = normal 4 = watery with dehydration

*Continued from page 13*

and have a long history in human health, but they are being 'rediscovered' as natural alternatives for use in maintaining animal health and performance.

Not only are these products effective, they have the added benefit of being favourably viewed and accepted by today's discerning consumers.

## The role of phytogenics

Phytogenic feed additives are a group of plant-derived substances that have been known for thousands of years. Their main actions are:

● **Positively impact palatability:** this is especially useful with:

a) ad libitum feeding (calves reared in a 'natural way' will drink 8, 10 or more litres of milk/day and achieve a much higher growth rate than calves fed a limited amount of milk.

b) calves that are off-feed for whatever reason will consume more and return to normal intake sooner when the appetite is stimulated by phytogenic additives.

● **Increased digestibility:** a combination of different factors, such as increased saliva production, enzyme secretion and optimisation of intestinal microbiota are primary and lead to a reduction in toxic microbial metabolites, relief from immune stress, and

reduction in subclinical intestinal inflammation processes. These effects lead to better calf health through a higher nutrient availability and reduced pathogenic bacteria pressure.

The anti-inflammatory effect can be explained through the down-regulation of the transcription factor NF- $\kappa$ B (involved in the pro-inflammatory response) and the activation of the transcription factor Nrf-2, responsible for anti-oxidative activity (University of Giessen, Germany).

## Supplementation

A trial was held in the Land O'Lakes Research Facility (Iowa, USA) to investigate the effects the phytogenic additive Digestarom Milk (Biomim GmbH, Herzogenburg, Austria) on the performance and health of calves when added to a calf milk replacer (CMR) (courtesy of B. L. Miller, T. J. Earleywine and T.E. Johnson, Land O'Lakes Inc).

Digestarom Milk is a blend of plant extracts (herb, spices, essential oils and non-volatile plant extracts) formulated to increase palatability, digestion and improving zootechnical parameters which help maintain a better intestinal health and a reduction in digestive disturbances, i.e. scours.

In total 107 Holstein bull calves (3-10 days old) with an average initial weight of 47.3kg were randomly assigned according to body weight and blood gamma globulin levels to either a control or experimental milk replacer CMR diet offered in a 15% solids solution.

Both diets utilised a 22% all milk protein/20% fat non-medicated CMR powder.

The experimental diet was the same as the control except with phytogenic feed additive added at 0.05% on an as fed basis.

Calves were fed to provide 681g DM feeding rate daily in two feedings. Calf starter (18% crude protein, as fed basis) was fed ad libitum throughout this 42 day trial.

Calves offered the CMR with the phytogenic additive had greater total weight gain ( $P<0.10$ ), had greater CMR intake ( $P<0.07$ ), better feed efficiency ( $P<0.05$ ), lower scour scores ( $P<0.01$ ) and scour days ( $P<0.01$ ) when compared to calves not receiving Digestarom. Thus, the phytogenic additive improved calf performance and health status.

## Conclusion

As a general conclusion from the trial, phytogenics (Digestarom Milk) show an ability to improve feed intake and feed efficiency and reduce scour days and scour scores, indicating improved health status. These results encourage further research to be carried out on this topic. ■

---

*References are available  
from the authors on request*