Research Summaries

The effect of Celmanax™ SCP on fecal pathogen shedding, health, and performance of preweaned Holstein dairy calves

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Introduction

Diarrhea in preweaned dairy calves is a significant cause of morbidity and mortality. Optimizing health in this crucial period without antibiotics is of primary interest. Celmanax™ SCP (CSCP) contains derivatives of *Saccharomyces cerevisiae* cell wall blended with fermentation products. Mannan oligosaccharides (MOS) are yeast cell wall components with binding sites for Gram negative bacteria that lead to pathogen removal (Nocek et al, 2011). MOS and β-glucans may produce immunomodulatory effects (Heinrichs et al, 2003; Nocek et al, 2011). Dosing with *S. cerevisiae* has been shown to prevent clinical signs in calves challenged with *Salmonella* spp (Brewer et al, 2014). Additionally, *S. cerevisiae* lowered fecal scores pre- and postweaning (Alugongo et al, 2016). Our objective was to investigate the effect of CSCP supplementation in Holstein dairy calves, on fecal pathogen shedding, overall health and average daily gain (ADG) during the preweaning period.

Materials and Methods

This randomized, placebo-controlled study was conducted at two commercial farms in Wisconsin. The study population included Holstein calves born between August-November 2016 (n=320). Calves were housed indoors, individually for day 1-6, and then group housed with an automatic feeder until day 56. Calves were randomized at birth into 4 treatment groups: placebo (milk replacer with food coloring), 1g, 2g, and 4g of CSCP supplementation. The treatments were administered by farm staff (day 1-6) or via automated feeder twice daily (day 7- 56). Farm staff and investigators were blinded to treatment. Investigators performed twice-weekly health scores using the University of Wisconsin Health Scoring App. Thoracic ultrasound was performed at week 3 and week 7. Fecal samples were collected at the first 2-4 exams at Herd A and Herd B, respectively. Qualitative Enterichek® (Biovet Inc.) and quantitative RT-PCR were used to analyze samples for *C. parvum*, coronavirus, rotavirus, and *Salmonella* spp. Statistical analyses were performed using SAS 9.4 software. Significance was determined at α=0.05.

Results

A total of 303 calves survived to the end of the study period. There were no differences in entry weights or passive transfer (PT) status among groups. The range of adequate PT status in all groups was 67-84% using the serum total protein (TP) 5.5 g/dl cutoff, and was 79-90% using the 5.2 g/dl cutoff. There was no difference in crude mortality among groups. The mean age of onset of mild diarrhea in all groups was 7.76 ±0.812 d. In calves with FPT (TP < 5.2 g/dl), the onset of mild diarrhea occurred 6.3 d earlier in placebo calves compared to the 2g-group ($P=0.02$). There were no differences in shedding of *C. parvum* or coronavirus between groups. There were 11% fewer calves in the 2g-group shedding rotavirus compared to placebo ($P=0.05$). There were 13% fewer calves shedding *Salmonella* spp. in the 2g-group compared to placebo ($P<0.05$). Raw ADG was 1.58±0.05 lb/day and there were no differences among groups. After controlling for birthweight, herd, passive transfer, the ADG in the 2g-group was greater compared to the ADG in the 4g-group (1.67±0.05 vs 1.51±0.05 kg/d, respectively; $P = 0.03$) but not different from the 1g or placebo groups. The majority of calves were diagnosed with pneumonia based on thoracic ultrasound (79.8±2.22%). Calves that had FPT (TP<5.2 g/dl) in the placebo group had more pneumonia than FPT calves in the 4g-group ($p=0.0263$).

Significance

CSCP supplementation during preweaning may help delay the onset of diarrhea and reduce pneumonia in calves with FPT. Dosing CSCP at 2g twice daily in milk replacer may reduce shedding of rotavirus and *Salmonella* spp and improve ADG.