

Evaluation of mycobacterium cell wall fraction (MCWF) immune stimulant as antimicrobial alternative following administration to veal calves

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Introduction

High levels of mortality in dairy calves is a significant welfare issue and a major source of economic losses. A preventative measure used to reduce mortality is antimicrobial incorporation into the milk or milk replacers. As a result of the abundant use of antimicrobials, high levels of antimicrobial resistant bacteria have been detected. With antimicrobial resistance becoming of greater concern worldwide, it is imperative to seek alternative treatment options. Mycobacterium cell wall fraction (MCWF), Amplimune™ (NovaVive Inc, Canada), is an immunostimulant licensed for treatment of infection caused by enterotoxigenic *E. coli* in young calves. In a recent study, application of MCWF on arrival in conjunction with metaphylactic treatment significantly reduced incidence and severity of respiratory and gastrointestinal clinical signs in veal calves. The main objective of the current study was to determine if MCWF could be used as a stand-alone preventative therapeutic administered on arrival. We hypothesized that, MCWF could be used as an antimicrobial alternative not only reducing mortality but also significantly reducing the incidence and severity of clinical conditions and consequently the number of antimicrobials used in the veal operations.

Materials and Methods

The study was randomized, controlled, and blinded. The study protocol was reviewed and approved by the test facility's Animal Care Committee before the start of the trial. Eighty calves were used in the study, and were randomly assigned into 2 experimental groups with 40 calves per group. On arrival, all animals were weighed and subjected to veterinary examination for any clinical signs. All animals received 1 dose of vitamins, intranasal vaccines, and milk replacer on day of arrival. Amplimune™ (1 mL; subcutaneously) was administered to 40 animals (MCWF group) on arrival and again 10 days later. Animals were monitored daily and scored for the presence and severity of respiratory and gastrointestinal clinical signs. In addition, data on feed consumption, average daily gain, number and cost of treatments was collected and

analyzed. All data were subjected to statistical analysis using One-way ANOVA test.

Results

The mean body weights of animals in the 2 experimental groups were not statistically different at the beginning of the study (102.2 lb [46.45 kg] and 101.5 lb [46.14 kg], respectively). However, animals in MCWF group gained on average 151.5 lb (68.9 kg) while animals in control gained 144.4 lb (65.6 kg) (not statistically significant). Feed conversion was 1.9 lb per lb (0.86 kg per kg) of weight gain in MCWF group and 2.13 lb (0.97 kg) in the control group. In addition, average daily gain for animals in the MCWF group and controls was 1.94 lb (0.88 lb) and 1.79 lb (0.81 kg), respectively (not statistically significant). Observed mortality rate in the MCWF group was 2.5% (1/40) compared to 10% (4/40) in the control group ($P < 0.05$). There was a statistically significant difference ($P < 0.01$) between the average number of treatments in the MCWF and control groups for both clinical conditions. There was no statistical difference in average number of treatments for scouring (0.7 and 0.97 for MCWF and controls); however, 50% (20/40) of calves receiving MCWF did not show signs of scouring while 75% (30/40) of calves in the control group had signs of diarrhea and required treatment. Furthermore, animals in MCWF group had on average 1.54 treatments for respiratory disease, while control animals required an average 2.51 treatments ($P < 0.01$).

Significance

Current data suggest that administration of MCWF at the time of arrival and 10 days after arrival could prevent or reduce the incidence and severity of respiratory and gastrointestinal signs and therefore reduce economic losses due to the increased feed consumption, as well as reduce the number of underweight or dead animals. Larger studies are underway to further explore MCWF mode of action and to develop application protocols to improve the health status of young calves.