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The effect of a core antigen vaccine on health and performance of cattle diagnosed with bovine respiratory disease

Abstract

When studied in receiving trials at three locations, health or performance of calves receiving a core antigen vaccine was not improved.

Keywords

Cattlemen's Day, 1995; Kansas Agricultural Experiment Station contribution; no. 95-357-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 727; Beef; Core antigen; Vaccine; Health; Performance

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**THE EFFECT OF A CORE ANTIGEN VACCINE ON
HEALTH AND PERFORMANCE OF CATTLE DIAGNOSED
WITH BOVINE RESPIRATORY DISEASE**

*G. L. Stokka, R. T. Brandt, Jr.,
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Summary

When studied in receiving trials at three locations, health or performance of calves receiving a core antigen vaccine was not improved.

(Key Words: Core Antigen, Vaccine, Health, Performance.)

Introduction

Undifferentiated bovine respiratory disease results in millions of dollars lost each year to the beef cattle industry. The cause is often multifactorial but may involve viral or bacterial agents, or both, in addition to risk factors that increase susceptibility to the disease. Gram negative bacteria such as *Pasteurella hemolytica* and *P. multocida* are often involved. Disease conditions caused by gram negative bacteria are most often consequences of the animal's reaction to a lipopolysaccharide component of bacterial cell walls called endotoxin. Effects of endotoxin include increased heart rate with decreased cardiac output, decreased systemic blood pressure, and hyperthermia followed by hypothermia, respiratory distress, and diarrhea.

Numerous commercial vaccines have been developed to prevent respiratory disease, but the success of vaccination with some of these products has been debatable. Recent developments have made it possible to prepare vaccines from isolated bacterial cell wall components called core antigens. Limited information is available on the efficacy of these products in reducing the effects of gram negative infections, particularly respiratory disease. These trials were designed to evaluate the efficacy of *E. coli* J5 core antigen vaccine on health and perfor-

mance of beef cattle under the difficult conditions surrounding their arrival at feedlots that result in respiratory disease.

Experimental Procedures

Approximately 115-200 calves at each of three different sites were used in the study. Each site represented a different set of risk factors for respiratory disease. Trial 1 represented long haul, moderately to highly stressed calves weighing approximately 500-550 pounds. Trial 2 represented freshly weaned, short haul, moderately stressed calves weighing approximately 516 pounds. Trial 3 represented long haul, highly stressed bull calves weighing approximately 550 pounds.

Trial 1. This trial was a completely randomized design with a four-way treatment structure. Treatment 1 was tilmicosin (Micotil® 8cc) given subcutaneously as a mass medication on arrival, plus the *E. coli* core antigen vaccine. Treatment 2 was 20 cc of 100 mg oxytetracycline given intramuscularly as a mass medication on arrival, plus core antigen vaccine. Treatments 3 and 4 were tilmicosin or oxytetracycline without the core antigen vaccine. All calves received IBR, PI3, BVD, BRSV (MLV), and a clostridial 7-way vaccine and were dewormed on arrival. Calves were purchased in Mississippi, processed on the day of arrival, and randomly assigned to one of the four treatments.

Trial 2. This trial was a completely randomized design with calves randomly assigned to one of two treatments and one of four pens. Calves were removed from the cows, held off feed and water overnight and processed the following morning. Treatment 1 received the *E. coli* core antigen vaccine, and treatment 2 did

not. All calves were given IBR, PI3, BVD, BRSV (MLV), and 7-way clostridial vaccines and were dewormed at processing.

Trial 3. This trial was a completely randomized design, with calves assigned to one of two treatments across pens. One hundred fifteen bull calves weighing approximately 550 pounds were purchased from Missouri. Calves were processed approximately 2 1/2 days after arrival and subsequently monitored for signs of illness. Treatment 1 received *E. coli* core antigen vaccine on arrival; treatment 2 calves did not. All calves received IBR, PI3, BVD, BRSV (MLV), and 7-way clostridial vaccine and were dewormed on arrival.

Results and Discussion

Trial 1. One hundred ninety five calves were included in this study. Thirty five were diagnosed with respiratory disease, for a morbidity rate of 17.9%. Data are shown in Table 1. Peak incidence of morbidity occurred on day 5. No calves died.

There was a significant treatment effect in the number of pulls. The comparison favored the cattle that were mass medicated on arrival with tilmicosin (P=.0074), regardless of the effect due to the core antigen vaccine. Micotil® is a long acting, macro-

lide antibiotic, that has been proven to reduce morbidity when used as a mass medication on arrival. Growth performance data was not collected at this site.

Trial 2. Peak incidence of morbidity occurred approximately day 9 post weaning. A total of 107 calves were diagnosed as ill out of 243, and one calf died of bloat. Data are shown in Table 2. There were no significant differences in morbidity due to treatment.

Trial 3. A total of 94 calves out of the 115 were diagnosed and pulled for respiratory disease. Peak incidence of morbidity occurred on day 10. Results are shown in Table 3. No significant differences occurred in the number of pulls or deaths for those calves receiving or not receiving the core antigen vaccine.

No differences occurred in growth performance of calves in the first 21 days of the receiving phase.

The use of respiratory vaccines to prevent undifferentiated bovine respiratory disease is a well accepted practice in the beef industry. There is recent interest in the use of core antigen vaccines to prevent the effects of endotoxemia, which accompanies gram negative respiratory infections. Our work indicates that, in several different stress categories and types of cattle, there is no benefit to the use of *Escherichia coli* core antigen vaccine against undifferentiated bovine respiratory disease.

Table 1. Effect of a Core Antigen Vaccine on Morbidity of Moderately Stressed Long-Haul Calves

Treatment	No. of Pulls ^a	% Morbid.	No. of Calves
tilmicosin + core antigen	4	8.2	49
oxytetracycline + core Antigen	11	22.4	49
tilmicosin	6	12.5	48
oxytetracycline	14	28.6	49

^aRemoval from pens for treatment of respiratory disease.

Table 2. Effect of a Core Antigen Vaccine on Morbidity and Growth Performance of Moderately-Stressed, Weaned Calves

Treatment	No. of Pulls ^a	% Morbid.	ADG (30 Days)	No. of Calves
Core antigen	52	48.6	1.70	121
No antigen	55	51.4	1.58	122

^aRemoval from pens for treatment of respiratory disease.

Table 3. Effect of a Core Antigen Vaccine on Morbidity, Mortality and Growth Performance of Highly Stressed Bull Calves

Treatment	No. of Pulls ^a /Deaths	Percent Morbid./Mort.	Mean ADG (21 days)	No. of Calves
Core antigen	49/3	87.5/5.4	0.6	56
No antigen	45/5	76.3/8.5	0	59

^aRemoval from pens for treatment of respiratory disease.