This study also states that 14.4% of 11.75 million head of cattle were treated for BRD at a cost of $12.59 per animal for a total of $21.3 million for the year the study was conducted. There is currently no technique available that will allow producers and practitioners to objectively evaluate an animal for BRD and attempt to control these costs. Near-infrared spectroscopy may give the industry the ability to make objective decisions regarding the management and treatment of BRD. Based on the significant difference of the ranks between the cattle at processing and the cattle identified as being ill, near-infrared spectroscopy may prove to be a good technique to aid in the management of BRD.

Near-infrared spectroscopy can potentially be used in the purchasing, sorting and treating of cattle with BRD. Cattle could be assessed at purchase to determine if there is any pre-existing lung pathology. StO2 may also be able to detect cattle that will perform better than others in both the feedyard and the packinghouse. Near-infrared spectroscopy may be able to reveal if cattle have too much existing pathology to be treated effectively, or if cattle that we think are "treated-out" can still benefit from antibiotic therapy. Near infrared spectroscopy has the potential to drastically affect the way BRD is managed, and beef production in general. Using near-infrared spectroscopy, producers and veterinarians may be able to make informed, objective decisions about the management of their cattle.

A Study to Compare the Efficacy of Three Oxytetracycline Regimens for the Treatment of *Anaplasma Marginale* Carrier Status in Beef Cattle

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Introduction

Anaplasmosis is a blood-borne disease of cattle and other ruminants caused by *Anaplasma marginale*. Animals recovering from clinical anaplasmosis and those treated with therapeutic doses of oxytetracycline remain persistently infected with microscopically undetectable levels of the organism. These animals serve as reservoirs of the disease which can be spread mechanically or through arthropod vectors. Tetracyclines are the only compounds approved for treatment of acute anaplasmosis infections in the United States; however no compounds are approved for eliminating the carrier state. This has contributed to the restricted movement of cattle from endemic areas of the US to anaplasmosis-free territories such as Canada. Anaplasmosis is estimated to cost the US cattle industry $100 million per year, with some estimating the cost of resticted trade to be near $300 million annually. The objective of this study was to compare the effects of three oxytetracycline treatment regimens on eliminating *Anaplasma marginale* infection from carrier beef steers.

Materials and Methods

Forty-six Angus X Simmental steers, aged 6 - 12 months, were inoculated IV with approximately 2.6 x 10^9 *Anaplasma marginale* (Oklahoma isolate) infected erythrocytes. Animals were monitored for parasitemia on blood smear and changes in hematocrit. Serology was also conducted using a competitive ELISA Anaplasma Antibody Test Kit (VMRD, Inc. Pullman, WA). All subjects demonstrated clinical signs of anaplasmosis and recovered without treatment. The ability of carriers to transmit *A. marginale* was demonstrated by sub-inoculation of 50 ml of heparinized blood into 45 splenectomized Holstein calves. The diagnosis of anaplasmosis in splenectomized calves was based on the presence of

clinical signs of disease, a decreased PCV, increases in plasma cELISA values and the presence of anaplasmosis parasites on blood smear examination. A post-mortem examination was also conducted on infected calves following euthanasia. At 66 days after infection animals were designated carriers based on a positive cELISA test (>30% inhibition), a parasitemia (≤ 1%) and the ability to infect splenectomized calves. Infection was also confirmed by nested PCR (Polymerase Chain Reaction) followed by DNA hybridization.

Forty of these steers were blocked by bodyweight and randomly assigned to four treatment groups. Treatment A consisted of a 300 mg/ml solution of oxytetracycline (Tetradure LA-300, Merial Canada Inc., Baie d'Urfe, Quebec) administered at 13.6 mg/lb (30 mg/kg) IM on day 0. Treatment B consisted of the same formulation administered at 13.6 mg/lb (30 mg/kg) IM on day 0 and again on day 5. Treatment C consisted of a 200 mg/ml solution of oxytetracycline (Liquamycin LA-200, Pfizer Animal Health, Exton, PA) administered at 10 mg/lb (22 mg/kg) IV, q 24 h for five days. This corresponds with the current OIE recommended treatment of anaplasmosis prior to export. Treatment group D consisted of untreated, infected control animals. Carriers were monitored at 31 and 60 days after treatment using PCR and cELISA. Testing by nPCR was also conducted at these time points. At 60 days after treatment, 50 ml of blood was collected from each carrier steer for subinoculation into 40 splenectomized calves. Carrier steers inducing clinical anaplasmosis in splenectomized calves were recorded as treatment failures.

Results

All animals remained positive for anaplasmosis by nested PCR and DNA hybridization. cELISA values also remained positive (above 30% inhibition). Data for each group were statistically compared at each time point using analysis of variance (ANOVA) and multivariate ANOVA (MANOVA) to account for repeated measures over time. The Tukey Kramer HSD method was used to compare groups. Results indicated a significant ($p < 0.01$) reduction in mean cELISA of group C when compared with group A and group D at 31 days after treatment. Differences were not evident at 60 days after treatment. Following subinoculation of carrier blood into splenectomized calves, all except one calf, which died from Salmonella septicaemia post-inoculation, developed clinical anaplasmosis.

Significance

All treatment regimens failed to clear the carrier state of *Anaplasma marginale*. These findings suggest that current recommendations regarding clearance of carrier infections with oxytetracycline may be inadequate. Further research is required to evaluate these findings in animals with naturally acquired infections.