Using Oxidative Stress Biomarkers to Identify High-Risk Cattle in a Feedlot

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INTRODUCTION

Bovine respiratory disease is the most important disease in feedlot cattle. The current method of identifying feedlot cattle with respiratory disease is by trained pen riders. Two studies have shown that between 40 and 70% of animals, never identified as sick, had pulmonary lesions at harvest (Wittum et al, 1996; Thomson et al, 2004). Better methods of identifying sick animals are required. Specific oxidative stress biomarkers (OSBs) have been shown to be elevated in humans with inflammatory conditions.

MATERIAL AND METHODS

Whole blood samples were collected via the caudal vein on 2300 commingled, high-risk cattle on arrival at 3 commercial feedlots. Blood samples were assayed for 2 OSBs (OSB1 and OSB2). Animals were individually identified and health (morbidity and mortality) and performance (weight gain and carcass characteristics were recorded. Multivariable logistic and linear regression techniques were used; feedlot was treated as a random variable.

RESULTS

Overall, 35.6% of cattle were treated for respiratory disease and between feedlot varied from 20.6 to 58.0%. Of the cattle enrolled, 3.9% died from respiratory tract disease and varied from 1.1 to 8.8% among feedlots. Morbidity increased ~7.4% for each 100-unit increase in OSB1 (P=0.01). Mortality attributable to respiratory disease increased 9.8% for each 100-unit increase in OSB1. Hot carcass weight decreased 1.14 kg for each 100-unit increase in OSB1 (P=0.01). Weight gain decreased 0.005 kg/day for each 100-unit increase in OSB1. Arrival weight increases 0.04317 lbs for each unit increase in OSB1. OSB2 was not associated with the variables analyzed.

CONCLUSION

Increased OSB1 was associated with an increased likelihood of adverse animal health outcomes, which demonstrates that specific OSBs may be used to identify those animals more likely to require treatment for BRD. Animals with the elevated OSB1 levels could be segregated and managed differently than those with lower levels. This might allow feedlots to develop targeted strategies and direct labor to the populations of greatest risk for BRD.

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REFERENCES

Wittum et al. (1996) Relationships among treatment for respiratory tract disease, pulmonary lesions evident at slaughter, and rate of weight gain in feedlot cattle. *J Am Vet Med Assoc.,* 209:814-818

Thomson. (2004) Auditing the health status of the feedyard. *Western Veterinary Conference*. Las Vegas, Feb 16-20, 2004.