

## **IMPACT OF ORAL MELOXICAM ON CIRCULATING PHYSIOLOGICAL BIOMARKERS OF STRESS AND INFLAMMATION IN BEEF STEERS AFTER LONG DISTANCE TRANSPORTATION**

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Bovine respiratory disease (BRD) is a serious consequence of transportation stress, resulting in significant economic losses to producers due to increased mortality, decreased animal productivity and increased labor and medication costs. Meloxicam (MEL) provides pain relief and anti-inflammatory effects in cattle for several days after a single oral treatment. Our hypothesis was that MEL administration before shipping would reduce the impact of long distance transportation on circulating physiological biomarkers of stress and inflammation in beef steers. Ninety-seven beef steers were blood sampled for baseline biomarker determination and then randomly assigned to receive either 1 mg/kg MEL (n = 49) or a placebo (CONT) (n = 48) per os prior to a 1,316 km transportation event lasting approximately 16 h. Calves were then blood sampled on arrival and 5 days later. Changes in the hemogram, circulating plasma proteins, total carbon dioxide (TCO<sub>2</sub>), fibrinogen, substance P (SP), cortisol, haptoglobin (Hp)-matrix metalloproteinase-9 (MMP-9) complexes and tumor necrosis factor alpha (TNF $\alpha$ ) between treatment groups over time were compared using a Mixed Effects Model with statistical significance designated as P < 0.05. ANCOVA was conducted to assess the relationship between circulating MEL concentrations and biomarker changes over time. An increase in neutrophil, platelet, monocyte, white blood cell and red blood cell counts occurred after transportation (P < 0.0001) and a decrease in lymphocyte count was observed (P < 0.0001). Furthermore, HP-MMP-9 complexes, TCO<sub>2</sub>, TNF $\alpha$ , plasma proteins and SP increased and cortisol decreased after shipping (P < 0.01). There was a time-by-treatment interaction on serum cortisol concentrations (P = 0.04). MEL treatment reduced the stress-induced neutrophilia (P = 0.01) and circulating monocyte count (P = 0.013) on arrival and tended to reduce serum cortisol concentrations (P = 0.08). Mean corpuscle hemoglobin (P = 0.05), mean corpuscle volume (P = 0.05) and lymphocyte count (P = 0.05) was also greater in the CONT calves compared with MEL calves after transportation. An inverse relationship between plasma MEL concentrations and circulation cortisol concentrations (P = 0.002), neutrophil (P = 0.04) and basophil counts (P = 0.03) was also observed. The results suggest that MEL administration may reduce the impact of long-distance transportation on circulating physiological biomarkers of stress in beef calves.



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