

Effects of Chromium Propionate Supplementation on Feedlot Performance during the Receiving Period of Stressed Beef Cattle

One hundred eighty (180) steers were selected for use in this study with the following treatments (dry matter (DM) basis): 1.) Control, 0 mg/kg added chromium, 2.) 0.1 mg/kg added chromium, 3.) 0.2 mg/kg added chromium 4.) 0.3 mg/kg added chromium. Dry matter intake (DMI) tended to increase linearly from days 0 to 28, as chromium supplementation increased, ($P=0.07$). During the same period, average daily gain (ADG) increased linearly ($P < 0.05$) as chromium levels increased (12.6% increase when comparing control and 0.3 mg/kg), BW and feed to gain (F:G) showed a significant quadratic effect ($P \leq 0.05$) with 0.1 mg/kg being the least desirable and 0.3 mg/kg being the most accelerated. Over the entire study, BW ($P = 0.08$) and DMI ($P = 0.12$) increased linearly as the level of chromium propionate increased. Average daily gain and feed efficiency increased linearly as chromium propionate concentrations increased ($P \leq 0.05$), with an increase of 10.8% and 4.2%, respectively when comparing control and 0.3 mg/kg. Morbidity showed a tendency ($P = 0.07$) for a linear decrease in the number of head treated at least once for respiratory symptoms as the chromium propionate concentration increased. Numerically 12.5% less cattle were treated at least once for respiratory symptoms in the 0.3 mg/kg treatment group versus other treatment groups. Supplementation of KemTRACE[®] brand Chromium Propionate demonstrated a positive impact on the performance and health of newly received beef steers¹.

KEYWORDS: Beef, Cattle, KemTRACE minerals, Chromium, Feedlot, Performance, Health

Introduction

Researchers and nutritionists have fed supplemental chromium in various forms since the mid nineteen hundreds. No feeding performance information existed on the effects of chromium propionate fed to beef cattle prior to the initial work of Rounds⁵. Chromium supplementation from multiple Cr-sources has improved weight gain during receiving and growing periods in beef cattle^{2,3,4}. Literature confirms supplemental organic chromium (chromium yeast or chelated chromium) can increase rate of gain from 0-30%, depending on level of stress and disease challenge¹. Reduced morbidity and improvements in growth performance were observed after arrival of transit stressed feeder calves fed various forms of supplemental chromium^{4,6,7}.

The objective of this study was to evaluate the effect of feeding increasing levels of supplemental chromium in the form of chromium propionate (KemTRACE[®] brand Chromium Propionate) on feeding performance and animal health during the receiving period of beef feeder cattle¹.

Materials and Methods

Two loads of cattle (British X Continental breeding, average off truck weight of 229kg) were received, arriving six days apart. One hundred eighty (180) steers were selected for use in the study, blocked by weight and randomly assigned to pens with the inclusion of at least two head from each arrival group in each pen. The study was a completely randomized block design, (36 pens; 9 pens/treatments; 4 pens/block; 5 steers/pen). Upon arrival, cattle were housed in dirt-lot pens with *ad libitum* access to sudangrass hay. The following morning, a 63% concentrate basal ration was fed on top of the sudangrass hay. Cattle were processed upon arrival. Processing included: individual ear tag identification, vaccination with a modified live virus vaccine, clostridial bacterin toxoid, treatment for internal parasites, antibiotic treatment and implantation with Ralgro[®] (is a registered trademark of Schering-Plough Animal Health Corporation).

Cattle were fed once daily in the morning (0700 to 0800 h). Cattle were fed a 63% concentrate diet from days 0 to 14. Diet concentrate level was increased at day 14 and day 28 (73 and 83% concentrate diets, respectfully).

The 83% concentrate diet was fed for the remainder of the trial. Daily feed deliveries adjusted to guarantee *ad libitum* access to feed. Diets were formulated to meet or exceed NRC (1996) recommendations. The treatment premixes were added at a rate of 2% (DM basis) of the total feed delivered. Cr was supplied in the form of KemTRACE® brand Chromium Propionate 0.04%. Premixes were top dressed and hand mixed into the delivered daily ration. Cattle health was evaluated daily for clinical signs of illness. Rectal temperatures were taken on cattle pulled. Cattle with temperatures $\geq 39.7^{\circ}\text{C}$ were treated. All cattle were immediately returned to their home pen after proper treatment. Daily treatments were recorded.

Results and Discussion

In this study, steers fed chromium propionate showed a linear increase in average daily gain ($P \leq 0.03$) and feed efficiency ($P \leq 0.05$) as chromium propionate concentrations increased, with an increase of 10.8% and 4.2%, respectively (when comparing the control and 0.3 mg/kg) (Figures 1 and 2).

Figure 1. Average Daily Gain - 0-56 Days on Feed, lbs

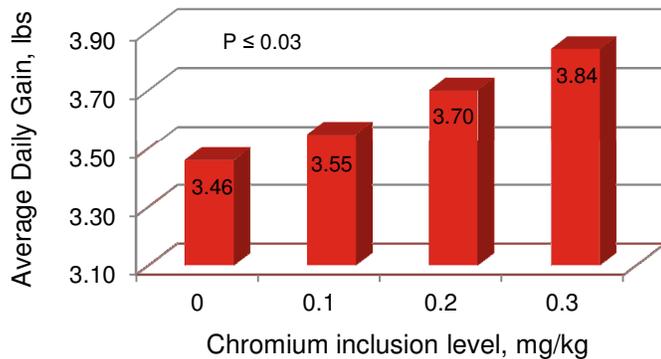
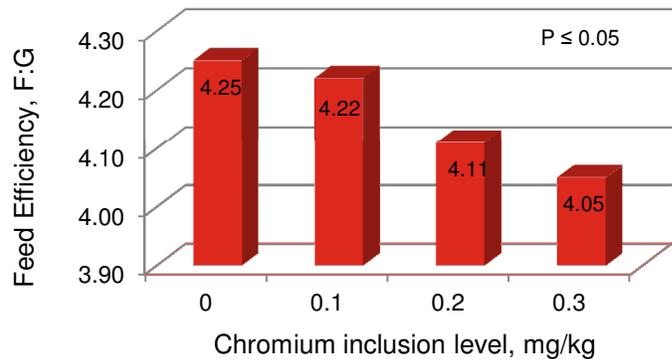
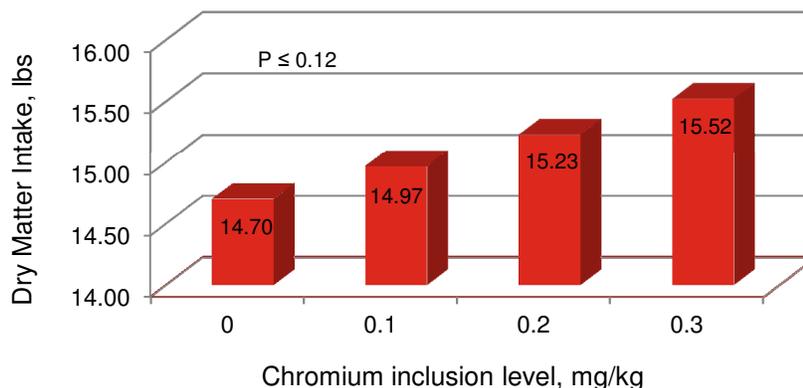


Figure 2. Feed Efficiency - 0-56 Days on Feed, lbs



In Figure 3, steers fed chromium propionate displayed a tendency to increase their dry matter intake (DMI) ($P = 0.12$) linearly as the level of chromium propionate was increased. The morbidity data showed results with a tendency ($P = 0.07$) for a linear decrease in the number of cattle treated at least once for respiratory symptoms as the chromium propionate concentration increased. Numerically 12.5% less cattle were treated at least once for respiratory symptoms in the 0.3 mg/kg treatment group versus other treatment groups.

Figure 3. Dry Matter Intake - 0-56 Days on Feed, lbs



This study was initiated to gain additional insight into feeding KemTRACE[®] brand Chromium Propionate to feeder cattle typical of the U.S. commercial cattle feeding business segment. Results of this study suggest that supplementation of chromium propionate to the basal diet can have a beneficial effect on the performance and health of newly received steers. More specifically, addition of 0.3 mg/kg of chromium propionate to the basal diet resulted in the strongest performance advantages and reductions in the incidences of morbidity over the entire trial period. When comparing cattle supplemented with 0.3 mg/kg of chromium propionate to control cattle, there was an 8 kg difference in final BW and over 18% fewer cattle were treated at least once. This translates to selling more pounds of beef, with less treatment cost.

References

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