



Effect of Zinc and Chromium supplementation on performance and carcass characteristics in feedlot steers.

O. Guimaraes*, J. Zervoudakis†, J. Torrecilhas‡, L. Hatamoto-Zervoudakis†, H. Toller*, H. Hallmark*, and T. E. Engle*

*Colorado State University, Department of Animal Sciences, Fort Collins, CO, 80523

†Universidade Federal do Mato Grosso, Cuiaba, Brazil

‡Universidade Estadual de Sao Paulo, UNESP, Jaboticabal, Brazil



ABSTRACT

One hundred and sixty-five crossbred steers were used to investigate the influence of supplemental zinc (Zn) and chromium (Cr) on performance and carcass characteristics of feedlot steers fed steam-flaked corn-based finishing diet. Steers were blocked by initial BW (518.9 ± 8.4 kg) within cattle source (2 sources) and housed in pens containing 6-7 steers per pen. Pens within blocks were randomly assigned to treatments in a 2 x 2 factorial arrangement, with factors being: 30 or 90 mg of Zn/kg DM and 0.0 or 0.25 mg Cr/kg DM. Treatments consisted of : 1) 30 mg Zn/kg DM ; 2) 90 mg Zn/kg DM; 3) 30 mg Zn + 0.25 mg Cr/kg DM; and 4) 90 mg Zn/kg + 0.25 mg Cr/kg DM. Zinc was supplemented as ZnSO₄ and Cr supplemented as Cr propionate. Steers were individually weighted on 2 consecutive days prior to initiating dietary treatment and on 2 consecutive days at the end of the experiment. Dietary treatment were initiated 64 days prior to slaughter (total days on feed = 240). All cattle were transported to a commercial abattoir on the same day and slaughtered. Steers receiving supplemental Cr had greater final BW ($P < 0.02$) and ADG ($P < 0.03$) when compared to non-Cr supplemented steers. Additionally, hot carcass weight ($P < 0.005$) and marbling score ($P < 0.03$) were greater ($P < 0.005$) for steers receiving 30 mg Zn/kg DM + 0.25 mg Cr/kg DM when compared to all other treatments. Dry matter intake, morbidity and mortality, and all the other carcass measurements were similar across treatments. These data indicate that under the conditions of this experiment, Zn and Cr supplementation may influence feedlot cattle growth and carcass characteristics.

MATERIALS AND METHODS

- 165 Crossbred Angus Steers BW (518.9 ± 8.4 kg)
- 16 Feedlot pens
- 240 days on feed – 64 days study (final)
- Treatments:
 - 30 ppm Zinc from Zinc Sulfate (30 mg/kg DM ZnSO₄)
 - 90 ppm Zinc from Zinc Sulfate (90 mg/kg DM ZnSO₄)
 - 30 ppm Zinc + 0.25 ppm Chromium (30 mg/kg DM ZnSO₄ and 0.25 Cr Propionate)
 - 90 ppm Zinc + 0.25 ppm Chromium (90 mg/kg DM ZnSO₄ and 0.25 Cr Propionate)

RESULTS

Variable	Treatment ^a				SEM	P <	Contrasts ^{b,1}		
	30Zn (1)	90Zn (2)	30Zn+0.25Cr (3)	90Zn+0.25Cr (4)			1	2	3
Initial BW ^b ,kg	512.3	513.1	519.7	530.3	41.1	0.07	-	-	-
Final BW, kg	597.6	588.6	613.1	614.3	39.0	0.02	0.06	0.01	0.11
Average daily gain, kg/d	1.65	1.58	1.79	1.78	0.24	0.03	0.46	0.01	0.06
Dry Matter Intake, kg/d	10.6	10.4	11.0	10.5	0.73	0.05	0.02	0.14	0.13
Gain:Feed	0.15	0.16	0.16	0.17	0.01	0.17	-	-	-
Dressing %	61.8	62.1	62.25	61.38	1.02	0.24	-	-	-
Hot Carcass Weight, kg	370.5	367.0	383.9	377.3	26.3	0.005	0.01	0.08	0.03
Intramuscular fat ^c	584.1	579.0	647.3	614.3	59.4	0.03	0.29	0.01	0.02
Yield grade	3.69	3.54	3.81	3.64	0.33	0.31	-	-	-

^a1) 30 mg Zn/kg DM ; 2) 90 mg Zn/kg DM; 3) 30 mg Zn + 0.25 mg Cr/kg DM; and 4) 90 mg Zn/kg + 0.25 mg Cr/kg DM.

^bRepresents contrasts for significant main effects P value <0.05.

^cMarbling score; 300 = Slight^o, 400 = Small^o, 500 = Modest^o.

¹Contrast:

1) Trt 1+ Trt 3 VS Trt 2 +Trt 4 – ZINC EFFECT

2) Trt 1+Trt 2 VS Trt 3+Trt 4 – CHROMIUM EFFECT

3) Trt 1 VS Trt 3 – CHROMIUM EFFECT FOR Zn NRC LEVEL

- Steers receiving supplemental chromium had a greater FBW ($P < 0.02$) and ADG ($P < 0.03$) when compared to non-Cr supplemented steers.
- Additionally, hot carcass weight ($P < 0.005$) and marbling score ($P < 0.03$) were greater ($P < 0.005$) for steers receiving 30 mg Zn/kg DM + 0.25 mg Cr/kg DM when compared to all other treatments.
- Dry matter intake, morbidity, mortality, and all the other carcass measurements were similar across treatments.



DISCUSSION

- ❖ Responses to increasing dietary zinc in finishing cattle have been variable in previous studies.
- ❖ Increasing supplemental Zinc from 30 to 90 mg/kg did not affect performance over the 64 days period of feeding.

CONCLUSION

- ❖ Based on these data, chromium and zinc supplementation appear to impact performance and carcass characteristics during the finishing phase.