



EFFECT OF CHROMIUM PROPIONATE ON PERFORMANCE & CARCASS QUALITY OF FEEDLOT CATTLE WHEN CR CONSUMED 56 DAYS PRE-HARVEST

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The FDA CVM issued a regulatory discretion letter in July 2009 which allowed the use of chromium propionate (CP) as the chromium (Cr) source in cattle. The approval was for up to 500 ppb in a complete feed. Today, CP is the sole source of Cr permitted by the FDA for use in cattle diets.

Having reviewed the scientific literature concerning the effects of chromium on beef cattle, the following points can be made:

1. Cr is involved in energy metabolism in cattle by increasing the body's sensitivity to insulin.
2. Cr increases body stores of fat in adipose tissue while decreasing blood glucose.
3. The presence of Cr may decrease cortisol, which is typically elevated in times of stress. Cortisol is an insulin antagonist which prevents glucose uptake by the cell.
4. In highly stressed calves, Cr has been shown to reduce sickness and improve calf performance (gains, intakes and feed efficiency).
5. Researchers have shown that the changes in metabolism due to Cr may have a positive effect on marbling and quality grade.
6. Marbling is enhanced rather than the exterior fat deposits in beef cattle fed Cr.
7. In finishing cattle, the feeding of Cr has shown that rate of gain may be stimulated along with the efficiency of that gain.
8. In the presence of a repartitioning agent (Zilmax), data reveal that Cr stimulated gains and improved feed:gain beyond that observed in cattle fed the repartitioning agent alone.

Data on the feeding of CP and Optaflexx (Elanco) does not exist today based on a thorough literature search. With Zilmax off the market, it became important for data to be generated evaluating finishing cattle fed Optaflexx and Cr. Sachtleben and co-workers (2015) conducted a study in which crossbred yearlings were fed 300 mg of Optaflexx (OPT) per head per day in a diet which contained either 0 or 300 ppb Cr from CP. Diets were based on corn and distiller grains with limited roughage. The diets with 0 or 300 ppb Cr were fed for 56 days prior to harvest with BoVantage (BV) + OPT being fed to all cattle 30 days pre-slaughter. Carcass data were collected on all the cattle. The performance data are summarized in Table 1 and the carcass data in Table 2.

Table 1 - Effect of Chromium Concentration on Feedlot Performance 56 Days Pre-Harvest

Treatment	Description	ADG, lb	DMI, lb	F/G
1	Control	3.47 ^a	23.59	6.83 ^c
2	300 ppb Cr	3.86 ^b	24.03	6.23 ^d

ab(P < .075) cd(P = .10)

continued



The performance data reveal that cattle fed 300 ppb Cr gained faster ($P < .075$) and were more efficient in those gains ($P < .10$) than those fed diets without supplemental Cr. Over the 56-day period, this amounted to 21.84 lb of additional live weight gain and 0.60 lb less feed dry matter per pound of gain, resulting in an improved feed efficiency of 9%.

Table 2 - Effect of Chromium on Beef Cattle Carcass Data

Treatment	Description	Back Fat, Inches	Kidney, Heart Pelvic Fat, %	Ribeye Area, Sq In	Yield Grade	Marbling Score*	Quality Grade**	% Dress
1	Control	.60	1.98	12.68	3.41	4.46a	5.12c	63.26
2	300 ppb Cr	.63	1.98	12.71	3.38	4.97b	4.80d	62.94

ab($P < .10$) cd($P < .23$)

*Abundant = 9; Moderately Abundant = 8; Slightly Abundant = 7; Moderate = 6; Modest = 5; Small = 4; Slight = 3; Trace = 2; Devoid = 1

**Prime = 1; Prime- = 2; Choice+ = 3; Choice0 = 4; Choice- = 5; Select+ = 6; Select0 = 7; Select- = 8; Standard = 10

If cattle are sold on a grid system, this trial's data show quality grade went up from "high select" to "low choice." That move, depending on the select-choice spread, could mean the producer realizes increased profitability from \$0-25/ cwt of carcass.

Carcass data collected on all the cattle (Table 2) indicated that supplemental Cr increased ($P < .10$) marbling score and quality grade ($P < .23$). These carcass data as well as the growth benefits seen in Table 1 are well supported by data published in the scientific literature (literature sources provided by request).

ECONOMICS:

Currently, chromium propionate costs about \$.04/hd/day and the diet was \$173.10/ton of dry mater. Market cattle are worth \$1.50/lb. Based on these costs, the following economic table was developed for cattle fed 300 ppb Cr for 56 days prior to slaughter.

Treatment	Description	^a Feed Cost/ Head/Day	Weight Gain/ 56 Day, lb	Added lb vs. Treatment 1	^b Value of Added Wt	Cost/Gain
1	Control	\$2.04	194.32	-----	-----	\$.591
2	300 ppb Cr	\$2.12	216.16	21.84	\$32.76	\$.550

^a Based on data from Table 1. Treatment 2 has added cost of \$.04/hd/day for Cr.

^b Based on \$1.50/lb. live weight.

For an extra cost of \$4.48/head (56 days x .08/day) heavier live selling weight would return (\$32.76-4.48) an additional \$28.28. The producer would also realize a \$.04 reduction in cost/pound of gain.

