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Summary

Live BW and carcass traits of steer calves were evaluated after feeding Optaflexx (200mg/day) for 35 days on an intermittent basis or continuously. The negative control consisted of 63 days on the same diet without Optaflexx, whereas the positive control consisted of Optaflexx supplemented daily during the last 35 days prior to harvest. The four-day intermittent treatment consisted of feeding Optaflexx for seven days, followed by four days of no Optaflexx, while the seven-day intermittent treatment consisted of seven days on Optaflexx, followed by seven days off. In both the four-day and seven-day intermittent treatments, cattle received Optaflexx for a total of 35 days. Regardless of the delivery pattern, feeding Optaflexx increased ADG, DMI, and live BW. Feeding 200 mg per steer daily of Optaflexx for a total of 35 days in either four-day or seven-day intermittent patterns was as effective but no more so as continuous feeding for a 35-day period.

Introduction

Ractopamine hydrochloride (Optaflexx; Elanco Animal Health, Indianapolis, Ind.) increases live weight gain and gain efficiency. Optaflexx is approved for continuous feeding to feedlot cattle during the last 28 to 42 days prior to harvest at a dose ranging from 70 to 430 mg per steer daily or 9.1 to 27.3 g/ton of DM. Continuous feeding of Optaflexx for 42, 35, and 28 days prior to harvest at doses up to 200 mg per steer increased live BW by 16.4, 18.1, and 18.8 lb, respectively, compared with a control diet, and improved ADG by 0.53 lb/day in feedlot steers. In addition, LM area also was larger for treated animals, with no effect on fat depth. Additionally, about 87% of the live weight response has been observed in the first 28 days compared to 42 days when Optaflexx was fed at 200 mg/steer daily (*2006 Nebraska Beef Cattle Report, pp. 72-74, 2007 Nebraska Beef Cattle Report, pp. 65 - 67*). Studies in pigs indicate that intermittent use of Optaflexx increases ADG, F:G, and BW. Our objective was to evaluate the effects of intermittent use of Optaflexx on growth and carcass characteristics of feedlot steers.

Procedure

Crossbred steer calves (BW = 1057 $\pm$ 26 lb) were assigned to two blocks based on reimplant BW. The heavy block consisted of 1 replication of 40 steers, and the light block consisted of 7 replications of 280 steers. Steers were assigned randomly to a pen within block and pens assigned randomly to 1 of the 4 treatments (8 pens/treatment; 10 steers/pen). The treatments consisted of no delivery of Optaflexx (NONE), continuously feeding of Optaflexx throughout the last 35 days prior to harvest (CONTIN), intermittent seven day feeding Optaflexx followed by four days of withdrawal (4-dINT) and intermittent seven days feeding Optaflexx followed by seven days of withdrawal (7-dINT). The three treatments with Optaflexx resulted in a total of 35 days of feeding Optaflexx but on different days. Steers were managed during the pre-trial phase (102 days) in the actual experiment pens after being assigned within a block (4 pens for the heavy block and 28 pens for the light block). Three animals were removed from three different pens prior to Optaflexx feeding due to death or health reasons. Before the start of the trial, each steer was weighed on two consecutive days after feed restriction (decrease of 2 lb/day of DM during three days). Pens of animals were weighed weekly, with a 4% shrink factor applied to the BW, throughout the 63 days of the Optaflexx treatment period and prior to harvest.

Table 1. Diet composition and analyzed nutrient analysis for diets fed.

Ingredient	% of DM
High-moisture Corn	50.0
Wet Corn Gluten Feed	40.0
Ground Wheat Straw	5.0
Dry Supplement	5.0
Analyzed Nutrient Analysis, % DM	
DM	66.3
CP	14.3
Ether Extract	4.3
Calcium	0.66
Phosphorus	0.54
Potassium	0.74

Steers were implanted with Component TE-IS initially and re-implanted with Component TE-S 98 days prior to harvest. Steers were fed once per day at approximately 0830 hour, and the Optaflexx supplement was top dressed in a supplement at a rate of 0.5 lb per steer to ensure that steers received the amount of 200 mg of Optaflexx per day. The carrier used was fine ground corn. Steers received 0.5 lb of fine ground corn when not on Optaflexx or for the negative control treatment. Diets were formulated to meet or exceed NRC (1996) requirements for metabolizable protein, Ca, P, and K. High-moisture corn was fed at 50% of diet DM, wet corn gluten feed (Sweet Bran®, Cargill, Blair, Neb.) at 40% of DM and ground wheat straw at 5% of DM (Table 1). Diets were prepared by loading the HMC, WCGF, ground wheat straw, and then by adding dry supplement in the mixer/delivery box (Roto-Mix® model 420, *Roto-Mix, Dodge City, Kan.*). Rumensin and Tylan were fed to all steers, with consumptions of 348 and 90 mg/head/daily, respectively. Feeds and feeding procedures remained the same throughout

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Table 2. Growth performance of steers fed Optaflexx in continuous vs. intermittent patterns.

Treatments	NONE[1]	CONTIN[2]	4-dINT[3]	7-dINT[4]	SEM	P-value
Live Performance						
Initial BW, lb	1077	1076	1074	1090	8.7	0.28
Live Final BW, lb	1352[a]	1366[b]	1365[b]	1385[c]	10.7	0.04
DMI, lb/day	22.3[a]	22.0[a]	22.3[a]	22.9[b]	0.31	0.05
ADG, lb	4.36[a]	4.61[b]	4.61[b]	4.68[b]	0.09	<0.01
F:G[5]	5.33	5.14	5.21	5.22		0.09
Carcass Adjusted Performance						
FBW, lb	1347	1356	1351	1371	11.5	0.19
ADG, lb	4.36	4.45	4.40	4.47	0.12	0.40
F:G[5]	5.32	5.12	5.24	5.23		0.52

[1]NONE: treatment did not receive Optaflexx.
[2]CONTIN: treatment received Optaflexx for 35 days continuously.
[3]4-dINT: treatment received intermittent seven day feeding Optaflexx followed by four days of withdrawal.
[4]7-dINT: treatment received intermittent seven day feeding Optaflexx followed by seven days of withdrawal.
[5]Analyzed as G:F, reported as F:G.

Table 3. Carcass characteristics of steers fed Optaflexx in continuous vs. intermittent patterns.

Treatments	NONE[1]	CONTIN[2]	4-dINT[3]	7-dINT[4]	SEM	P-value
Carcass Characteristics						
HCW, lb	848	854	851	864	7.3	0.18
Dressing, %[a]	62.8	62.5	62.4	62.4	0.22	0.25
12th rib fat, in	0.5	0.48	0.49	0.52	0.03	0.51
Marbling score[b]	507	485	506	505	14	0.37
LM area, in^2	14.6	15.1	14.5	14.6	0.2	0.09
USDA yield grade[c]	2.73[a]	2.76[a]	2.45[b]	2.78[a]	0.1	<0.01

[1]NONE: treatment did not receive Optaflexx.
[2]CONTIN: treatment received Optaflexx for 35 days continuously.
[3]4-dINT: treatment received intermittent seven day feeding Optaflexx followed by four days of withdrawal.
[4]7-dINT: treatment received intermittent 7 day feeding Optaflexx followed by seven days of withdrawal.
[a]Dressing percentage = carcass weight / average live weight (4% shrink).
[b]USDA marbling score where 450 = slight50, 500 = small0, and 550 = small50
[c]USDA calculated yield grade = 2.50 + (2.5*FT, in) – (0.32*LM area, in^2) + (0.2*KPH, %) + (0.0038*HCW).

the pre-trial and trial phases, except for the use of the top dressing with or without Optaflexx that occurred only during the last 63 days prior to harvest.

Feed samples were collected from each load and each supplement (with or without Optaflexx) every other week, during the mixer discharge in the beginning, middle, and end of each load. Optaflexx supplements were sampled from supplement bags. Samples were processed and analyzed for DM content, CP, Ca, P, K, and ether extract.

All steers were harvested on the same day after 165 days on feed, and 63 days of Optaflexx treatment period. At harvest, HCW were collected, and after approximately a 48-hour chill, LM area and fat thickness were measured. Bone score, lean score, and KPH were subjectively assigned by a University of Nebraska–Lincoln research technician, and marbling score was assigned by a USDA grader. Yield grade was calculated using the equation (YG= 2.50 + (2.5*FT, in) – (0.32*LM area, in^2) + (0.2*KPH, %) + (0.0038*HCW, lb)).

Growth performance was evaluated on a 4% shrunk weight basis, across and within the Optaflexx treatment period. Data from the randomized complete block design were analyzed using a mixed model analysis (Proc Mixed, SAS), with treatment and block included in the model as fixed variables. Pen was the experimental unit. Data were analyzed using a protected *F*-test and means separated using a bonfevroni t-test when the F-test variable was significant (i.e., alpha = 0.05).

Results

Results for feedlot performance and carcass characteristics are presented in Table 2 and Table 3, respectively. Dry matter intake was affected ($P = 0.05$) by Optaflexx 7-dINT treatment with steers consuming slightly more DM than all other treatments.

Live BW increased ($P < 0.04$) for all Optaflexx treatments compared to NONE. Optaflexx 7-dINT was also significantly different from the CONTIN and 4-dINT. The CONTIN was 14 lb heavier than the NONE, the 4-dINT was 13 lb (no difference when compared with the CONTIN) and the 7-dINT was 33 lb heavier than the NONE, and approximately 19 lb heavier than the CONTIN and 4-dINT treatments. Live ADG was also affected positively by the Optaflexx treatments compared to NONE, providing an increase of approximately 0.29 lb/day.

On a carcass basis, treatments were not different when compared to NONE, except for the calculated yield grade trait that decreased for the 4-dINT treatment when compared to all other treatments due to differences in KPH scores. Positive trends for carcass adjusted final BW, HCW, and LM area were observed mainly for the 7-dINT treatment when compared to the others. Efficiency analyses show that steers on Optaflexx treatments had numerically lower F:G than NONE (values numerically lower and P values less than 0.20).

Results from this experiment indicate that 200 mg/steer daily of Optaflexx fed intermittently increases DMI, ADG, and Live BW. Tendencies for a larger LM area on the positive control and better F:G on all Optaflexx treatments were also observed.

In conclusion, withdrawing Optaflexx for seven or four days then re-feeding, when compared to continuous, had no effect on live ADG or F:G.

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