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Summary

An experiment evaluated the live BW response of steers being fed Optaflexx for various durations. The design consisted of two Optaflexx levels (0 vs. 200 mg per steer daily) and two Optaflexx feeding durations (28 or 42 days immediately prior to slaughter). However, Optaflexx was started on the same day (day 151 of the feeding period). Feeding 200 mg/steer daily of Optaflexx significantly (P<0.01) improved final BW, ADG, and F:G compared to controls. Feeding 200 mg /steer daily of Optaflexx provided 16.4 and 18.8 lb of added BW above controls for the 28 and 42 feeding duration, respectively, but most (approximately 87%) of this weight gain was within the first 28 days of the time that Optaflexx was fed.

Introduction

Optaflexx (ractopamine hydrochloride) is a growth promoting feed additive approved for use with feedlot cattle the last 28 to 42 days immediately prior to slaughter. The expected increase in final BW of feeding 200 mg/steer daily of Optaflexx from Elanco's post approval studies is 14.8 to 17.6 lb. Market shifts and environmental factors such as weather make optimal slaughter dates challenging to predict prior to the start of feeding Optaflexx. The ability to predict performance changes during the late part of finishing period is important to justify making feeding and management changes to improve performance and carcass characteristics. Currently, there are limited data to evaluate the effects of feeding Optaflexx over time, or to evaluate the effects of Optaflexx when cattle are fed past their projected slaughter date.

The objectives of our study were to evaluate 0 and 200 mg/steer daily of Optaflexx fed to steers for the last 28 or 42 days immediately prior to slaughter, and to evaluate how feeding Optaflexx can affect feedlot performance past projected finishing dates.

Procedure

Crossbred steer calves (BW = 1189 lb) were used in a 2 by 2 factorial design (n=331; 28 pens). The treatments consisted of two Optaflexx levels (0 vs. 200 mg/steer daily) fed for two durations (28 or 42 days immediately prior to slaughter). However, Optaflexx feeding was started on the same day (day 151 of the feeding period). Steers were managed for a pre-trial phase (83 days) in pens of 20 head. At reimplant time cattle were weighed for two consecutive days. First day weights were used for stratification and steers were assigned to weight block (three blocks) and randomly allocated to treatment. Pens were assigned randomly to the four treatments. During weights on day 2, cattle were sorted into their respective pens with similar numbers of animals in each pen (12 steers/pen) and comparable bunk (>18 inches/head) space for each animal.

All steers were fed twice daily (0730 and 1230) with Optaflexx treatments being applied in a meal supplement fed at 4% of the diet DM. Metabolizable protein, Ca, P, and K requirements were formulated to meet or exceed NRC (1996) requirements. High-moisture corn was fed at 58.5% of DM, wet corn gluten feed at 30% of DM, and alfalfa hay at 7.5% of DM (Table 1). Diets were prepared by loading the HMC first and then by adding the supplement while the mixer/delivery box (Roto-Mix® model 420, *Roto-Mix®, Dodge City, Kan.*) was running at idle. Gluten feed and alfalfa hay were subsequently added and diets were mixed continuously for 12 revolutions (approximately three minutes) at 1,500 rpm. Feeds and feeding procedures remained the same throughout the pre-trial and trial phase, except for the use of the new supplements formulated to provide 0 and 200 mg/head of Optaflexx daily in the 28 or 42 days prior to slaughter.

Table 1. Diet composition and analyzed nutrient analysis.

Ingredient, % of DM	
High-moisture corn	58.5
Wet Corn Gluten Feed	30.0
Alfalfa hay	7.5
Dry supplement [a]	4.0
Analyzed Nutrient Analysis	
Moisture	67.89
CP, %	14.05
TDN, %	77.90
ADF, %	7.84
Calcium, %	0.66
Phosphorus, %	0.50
Ether Extract, %	4.30

[a]Dry supplement supplied 24.8 g/ton (DM basis) of Rumensin®, 90 mg/hd of Tylan®, and either 0 g/ton or 17.4 g/ton 100% DM of ractopamine to the experimental diets.

Two feed samples (approximately .5 lb) were retrieved from each batch of feed prepared for the morning feed deliveries (0730) in the first and last week of the experiment. Samples were collected at the mixer discharge from the beginning, middle, and end of each treatment load. Samples were processed and analyzed for CP, ether extract, TDN, ADF, Ca, P, and moisture.

Individual BW were collected on days -14, 0, and 28 or 42 of the experiment. Pen weights were taken on days -14, -7, 0, 7, 14, 21, 28, 35, and 42. A list of study events is presented in Table 2. All residual feed remaining at the time the steers were removed from their pen was weighed.

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On day 28, steers being fed Optaflexx for 28 days were transported to Excel, Schuyler, Neb., and randomly presented for slaughter. Steers being fed Optaflexx for 42 days were fed for an additional 14 days (past day 28) to determine the effects of Optaflexx on performance and carcass characteristics when steers are fed past their projected finishing date (179 DOF).

At slaughter, hot carcass weights were collected and carcasses were chilled for approximately 36 hours, after which LM area and fat thickness were measured and marbling score called by a trained 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)).

Data were analyzed using a mixed model analysis (Proc Mixed, SAS) with treatment (dose and duration) included in the model as fixed variables and block as a random effect. Day 0 weight was used as a covariate in the analysis. Pen constituted the experimental unit with probabilities less than or equal to α (0.05) being considered significant.

Results

Growth was evaluated on a 4% shrunk basis, across and within Optaflexx feeding durations. There were no Optaflexx dose (0 or 200 mg/steer daily) by Optaflexx feeding duration (28 or 42 days) interactions observed for growth performance traits in this study.

The main effects of feeding 200 mg/steer daily of Optaflexx to steers for either 28 or 42 days immediately prior to slaughter increased ($P<0.01$) final live BW and ADG by 0.53 lb/day (14.4%) compared to controls (Table 3). Using regression analysis (Figure 1) to calculate point-in-time estimates for Optaflexx response, the quadratic equation ($R^2 = 0.97$; P = .02; ($y = -0.0095x^2 + 0.83x + 0.53$)) would predict that feeding 200 mg/steer daily of Optaflexx would provide 16.4, 18.1, and 18.8 lb of added live BW above controls for a 28, 35 and 42 feeding duration, respectively.

Table 2. List of study events.

		Individual Weights		Pens Weights		Slaughter	
		Optaflexx Feeding Duration[a]		Optaflexx Feeding Duration[a]		Optaflexx Feeding Duration[a]	
Study Day	Date	28 days	42 days	28 days	42 days	28 days	42 days
-14	3/29/05	X	X	X	X		
-7	4/05/05			X	X		
0	4/12/05	X	X	X	X		
7	4/19/05			X	X		
14	4/26/05			X	X		
21	5/03/05			X	X		
28	5/10/05	X		X	X	X	
35	5/17/05				X		
42	5/24/05		X		X		X

[a] Optaflexx was fed the final 28 or 42 days immediately prior to slaughter.

Table 3. Main effects of growth and carcass characteristics of steers fed Optaflexx for an average of 35d[a].

Optaflexx mg/head/day	0	200		
Pens, n	14	14		
Steers, n	168	163	INT [b]	DOSE [c]
Performance, individual weights				
Initial BW, lb [d]	1189	1189	—	—
Final BW , lb	1318	1336	0.69	<0.01
DMI, lb/d	23.59	23.72	0.66	0.66
ADG, lb	3.68	4.21	0.44	<0.01
F:G	6.46	5.68	0.85	<0.01
Carcass Characteristics				
HCW, lb	844	854	0.74	<0.01
Dress, % [e]	64.08	64.01	0.37	0.60
12^{th} rib fat, in	0.66	0.64	0.99	0.28
LM area, in^2	14.07	14.21	0.42	0.34
Marbling score [f]	517	517	0.50	0.99
Yield grade, calculated [g]	3.30	3.24	0.63	0.52

[a]Steers were fed Optaflexx for 28 and 42 days and presented in the table as an average of 35 days. Growth performance calculated on a shrunk basis (4%), LS means.
[b]INT = Observed significance level for Optaflexx Dose by Duration treatment interaction.
[c]DOSE = Observed significance level for main effect of Optaflexx Dose.
[d]Initial weights were used as a covariate.
[e]Dressing percentage = carcass weight / average live weight (4% shrink).
[f]USDA marbling score where 450=slight50, 500=small0, and 550=small50.
[g]Where yield grade = 2.50 + (2.5*FT, in) - (0.32*LM area, in^2) + (0.2*KPH, %) + (0.0038*HCW, lb).

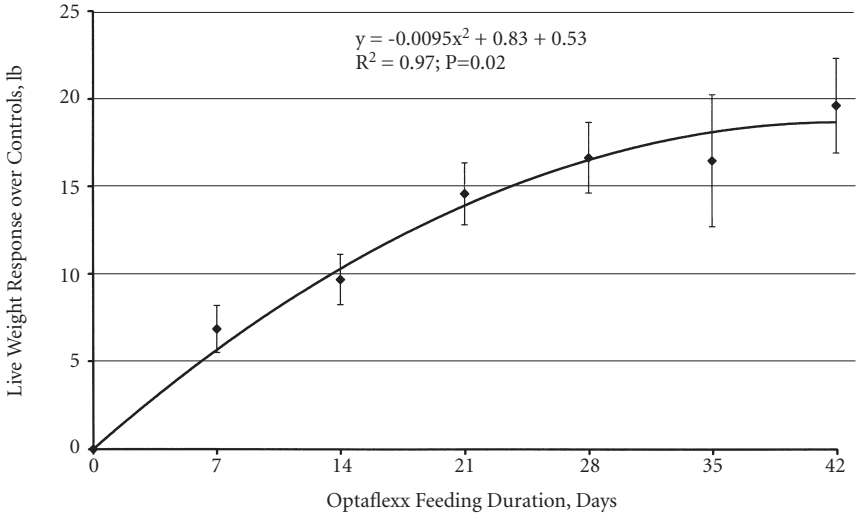

Figure 1. Growth performance profile for steers fed Optaflexx for 28 or 42[ab].
[a]Growth performance is calculated on a shrunk basis (4%), LS means.
[b]Day 7 – 28 has 28 Optaflexx pens averaged together (28 days and 42 days Optaflexx treatments), days 35-42 have only 14 pens (42 days Optaflexx treatments).

Table 4. Growth and carcass characteristics of steers fed Optaflexx for 28 or 42[a]

Oaflexx Feeding Duration	28		42			
Optaflexx mg/head/day	0	200	0	200		
Pens, n	7	7	7	7		
Steers, n	84	84	82	81	DOSE [b]	DURA [c]
Performance						
Initial BW, lb [d]	1189	1189	1189	1189	—	—
Final BW , lb	1294	1310	1342	1361	<0.01	<0.01
DMI, lb/d	23.16	23.42	24.01	24.01	0.63	0.02
ADG, lb	3.73	4.32	3.64	4.09	<0.01	0.07
Feed:gain	6.26	5.46	6.66	5.90	<0.01	<0.01
Carcass Characteristics						
HCW, lb	826	837	862	872	<0.01	<0.01
Dress, % [e]	63.88	63.93	64.29	64.10	0.64	0.06
12th rib fat, in	0.62	0.60	0.71	0.68	0.25	<0.01
LM area, in^2	13.59	13.86	14.55	14.57	0.37	<0.01
Marbling score [f]	517	512	517	522	0.96	0.42
Yield grade, calculated [g]	3.26	3.16	3.34	3.33	0.47	0.11

[a]Growth characteristics calculated on a shrunk basis (4%), LS means.
[b]DOSE = Observed significance level for main effect of Optaflexx Dose.
[c]DURA = Observed significance level for main effect of Optaflexx Duration.
[d]Initial weights were used as a covariate and are also represented as arithmetic means.
[e]Dressing percentage = carcass weight / average live weight (4% shrink).
[f]USDA marbling score where 450=slight50, 500=small0, and 550=small50.
[g]Where yield grade = 2.50 + (2.5*FT, in) - (0.32*LM area, in^2) + (0.2*KPH, %) + (0.0038*HCW, lb).

Feeding 200 mg/steer daily of Optaflexx to steers had no effect on DMI, thus, the added BW from feeding Optaflexx resulted in an improvement ($P<0.01$) in feed conversion (12.1%) over controls. Body weight, DMI and ADG were increased ($P<0.04$) with duration of feeding (Table 4). Pen weights were taken on a weekly basis to monitor the growth of steers (Table 2). Steers fed 200 mg/steer daily of Optaflexx had significant ($P<0.01$) increases in BW and ADG during all weekly weight intervals (7, 14, 21, 28, 35 and 42 days). There were no differences in DMI during any of the weekly measurements, resulting in significant ($P<0.03$) improvements in F:G during all weekly intervals.

There were no Optaflexx dose (0 or 200 mg/steer daily) by Optaflexx feeding duration (28 or 42 days) interactions observed for carcass characteristics in this study. The main effects of feeding 200 mg/steer daily of Optaflexx to steers for either 28 or 42 days immediately prior to slaughter, increased ($P<0.01$) hot carcass weights by 10.5 lb. Feeding 200 mg/steer daily of Optaflexx to steers had no effect on dressing percentage, 12th rib fat thickness, LM area, marbling scores, or calculated yield grade (Table 3).

Results from this experiment indicate feeding 200 mg/steer daily of Optaflexx for the last 28 or 42 days prior to slaughter increases BW, but most of this BW advantage (87%) is within the first 28 days of the feeding period. Steers fed Optaflexx past their projected slaughter date maintained their performance advantage over the controls.

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