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Kelsey J. Phelps

K. A. Miller

Cadra L. Van Bibber-Krueger

See next page for additional authors

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Abstract

The objective of this study was to compare the feedlot and carcass performance of the PN Beef Program in relation to a conventional feedlot diet when both diets are combined with or without exogenous growth promotants.

Keywords

Cattlemen's Day, 2014; Kansas Agricultural Experiment Station contribution; no. 14-262-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 1101; Beef Cattle Research, 2014 is known as Cattlemen's Day, 2014; Beef; Feed additives; Feedlot; Carcass traits; Alltech PN Beef Program

Authors

Kelsey J. Phelps, K. A. Miller, Cadra L. Van Bibber-Krueger, Andrea K. Sexten, J. Jennings, Brandon E. Depenbusch, John M. Gonzalez, and James S. Drouillard

Comparison of Conventional and Alltech Beef PN Finishing Programs: Performance and Carcass Characteristics

K.J. Phelps, K.A. Miller, C.L. Van Bibber-Krueger, A.K. Sexten, J. Jennings[1], B.E. Depenbusch[2], J.M. Gonzalez, and J.S. Drouillard

Introduction

By the year 2050, the global population will be 9 billion people, resulting in an unprecedented global demand for food. American beef producers currently employ a multitude of production programs that use feed additives such as Rumensin or Tylan (Elanco Animal Health, Greenfield, IN) and exogenous growth promotants (EGP) to maximize production efficiency. When Rumensin and Tylan are fed in combination, average daily gain and feed efficiency can be improved by 3% and 4%, respectively. When utilizing growth promotants, producers employ implant programs and feed beta-adrenergic agonists, such as Optaflexx (Elanco Animal Health), to enhance feed efficiency, average daily gain, hot carcass weight, and yield grades of carcasses. The PN Beef Program (Alltech, Nicholasville, KY) consists of two products that are designed to replace components of the conventional feedlot diet. The PN Beef Receiver is intended to be fed during the step-up period of feeding at a rate of 0.5 oz/animal daily, and PN Beef Finisher is intended to be fed during the remainder of the finishing period at a rate of 0.7 oz/animal daily. Because both products are new feed alternatives, the objective of this study was to compare the feedlot and carcass performance of the PN Beef Program in relation to a conventional feedlot diet when both diets are combined with or without exogenous growth promotants.

Experimental Procedures

Crossbred yearling steers (n = 512; 848 ± 17 lb initial body weight) were blocked by body weight and assigned to 64 pens with 8 steers assigned to each pen. The study was conducted as a randomized complete block experiment with a 2 × 2 factorial treatment arrangement. Factors in the study design consisted of a dietary feeding program and EGP regimen. For the dietary program factor, steers were separated into a conventional finishing program treatment or Alltech PN Beef Program treatment (Table 1). The components of the Alltech PN Beef Program diet were premixed into a ground corn carrier and subsequently blended into the total mixed ration. Both supplements contained a proprietary blend of organic trace elements, ascorbic acid, fermentation products, fermentation extracts, and selenium yeast. The PN Receiver portion of the diet was included in the total mixed ration for the first 21 days at a rate of 0.5 oz/animal daily. The PN Finisher was included in the total mixed ration at a rate of 0.7 oz/animal daily for the final 154 days of the feeding period. Each diet was fed with or without exogenous growth promotants. Steers receiving EGPs were administered a Component E-S (Elanco Animal Health,) implant on day 1 of the study, reimplanted with Component TE-IS (Elanco Animal Health) on day 94, and fed Optaflexx at a rate of 400 mg/animal daily the final 28 day before harvest.

[1] Alltech, Nicholasville, KY.

[2] Innovative Livestock Services, Great Bend, KS.

On day 175 of the experiment, animals were harvested at a commercial abattoir, where slaughter data were collected. After a 24-hour chill period, objective and subjective carcass characteristics were measured, including fat thickness over the 12th rib; ribeye area; percentage kidney, pelvic, and heart fat; marbling score; and USDA yield and quality grades.

Results and Discussion

Feedlot performance data for the study are displayed at the top of Table 2. No interaction between dietary program and EGP ($P > 0.10$) was detected for final body weight. Dietary program also did not affect ($P > 0.10$) final body weight, but use of EGPs increased ($P < 0.05$) final body weight by 165 lb. Results also indicate a dietary program and EGP interaction ($P < 0.02$) for dry matter intake. Steers in the PN/EGP+ group had the greatest dry matter intake of all the treatment groups. In addition, no dietary program and EGP interaction ($P = 0.78$) was detected for average daily gain, but the interaction of dietary program and EGPs only tended ($P < 0.10$) to affect feed efficiency. Steers receiving growth promotants possessed greater ($P < 0.01$) dry matter intake, average daily gain, and feed efficiency than steers finished without growth promotants. Dietary program did not affect average daily gain and feed efficiency ($P > 0.10$).

Carcass data for the experiment are also displayed in Table 2. No interaction was observed between dietary program and exogenous growth promotants for all slaughter and carcass data ($P > 0.10$). Dietary program did not affect ($P > 0.10$) the same data, except incidence of liver abscesses ($P = 0.05$). Livers from steers fed the PN Program supplements possessed a liver abscess incidence rate that was 6.4% greater than the steers fed the conventional feedlot diet. The increase in incidence of liver abscesses was expected because Tylan was removed from the PN Program diets. A large body of literature documents that implant regimens and feeding beta-agonists can improve muscle deposition and reduce carcass fat. In agreement with this data, steers finished with the use of implants and Optaflexx had heavier carcasses, larger ribeyes, and less kidney, pelvic, and heart fat. Interestingly, steers administered the growth technologies contained more ($P < 0.05$) 12th-rib fat than non-supplemented steers.

Implications

Replacing conventional feed supplements with Alltech PN supplements yielded similar feedlot performance and carcass characteristics. The use of implants and Optaflexx greatly improves feedlot performance and carcass characteristics in both production systems.

Acknowledgements

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Table 1. Diets (dry basis) for steers fed conventional feedlot diets[1] or Alltech PN program[2]

Ingredient, %	Conventional	Alltech
Wet corn gluten feed	35.00	35.00
Steam-flaked corn	53.55	53.56
Ground wheat straw	7.00	7.00
Feed additive premix	2.16	-
Mineral/vitamin supplement	2.29	2.23
PN supplement	-	2.21

[1]Conventional diets included vitamin A at 2,200 IU/kg; vitamin E at 22 IU/kg; copper sulfate to provide 10 ppm Cu; cobalt carbonate to provide 0.15 ppm cobalt; ethylenediamine dihydriodide to provide 0.5 ppm iodine; manganous sulfate to provide 60 ppm manganese; sodium selenite to provide 0.3 ppm selenium; zinc sulfate to provide 60 ppm zinc on a dry matter basis; as well as 300 mg/animal daily of monensin and 90 mg/animal daily of tylosin (Elanco Animal Health, Greenfield, IN).

[2]The Alltech (Nicholasville, KY) diet included PN Receiver in the total mixed ration for the first 21 days at the rate of 14 g/animal daily, which contained: zinc proteinate to provide 10.7 ppm zinc; manganese proteinate to provide 7.1 ppm manganese; cobalt proteinate to provide 1.2 ppm cobalt; copper proteinate to provide 2.9 ppm copper; calcium iodate to provide 0.6 ppm iodine; selenium yeast to provide 0.31 ppm selenium on a dry matter basis; as well as ascorbic acid, *Aspergillus oryzae* fermentation product, *Lactobacillus acidophilus* fermentation product, and *Enterococcus faecium* fermentation product. Thereafter, PN Finisher was included in the total mixed ration at the rate of 20 g/animal daily; 10.7 ppm zinc; manganese proteinate to provide 7.1 ppm manganese; cobalt proteinate to provide 1.2 ppm cobalt; copper proteinate to provide 2.9 ppm copper; calcium iodate to provide 0.6 ppm iodine; selenium yeast to provide 0.31 ppm selenium on a dry matter basis; as well as ascorbic acid, *Aspergillus niger* fermentation product, *Lactobacillus acidophilus* fermentation product, and *Enterococcus faecium* fermentation product. Both supplements were premixed into a ground corn carrier and subsequently blended into the total mixed ration.

Table 2. Feedlot performance and carcass characteristics of steers fed conventional feedlot diets or Alltech PN Program[1] diets with and without exogenous growth promotants (EGP)

	Conventional		Alltech PN			*P*-value		
Item	EGP-	EGP+	EGP-	EGP+	SEM	Program	EGP	Prog × EGP
Dry matter intake, lb/day	21.83[a]	23.61[b]	21.73[a]	24.48[c]	0.28	0.052	<0.01	0.02
Average daily gain, lb	2.62	3.55	2.62	3.57	0.05	0.95	<0.01	0.78
Feed:gain	8.29	6.64	8.29	6.85	0.12	0.10	<0.01	0.07
Carcass weight, lb	825.3	933.7	832.9	932.0	11.1	0.59	<0.01	0.40
Dressed yield, %[2]	63.2	63.5	63.7	63.4	0.38	0.63	0.95	0.40
12th-rib fat, in.	0.57	0.63	0.61	0.64	0.02	0.21	0.02	0.35
Ribeye area, sq. in.	13.2	14.7	13.1	14.7	0.13	0.67	<0.01	0.92
Kidney, pelvic, and heart fat, %	1.92	1.90	1.97	1.83	0.03	0.84	0.02	0.08
Total liver abscesses, %	12.6	12.6	22.5	15.5	3.6	0.05	0.28	0.28
Marbling score[3]	655	636	640	630	10.23	0.29	0.13	0.66
USDA yield grade	2.87	2.91	2.95	2.94	0.07	0.40	0.81	0.76

[1] Alltech, Nicholasville, KY.

[2] A 4% pencil shrink was applied to live weight for purposes of calculating dressed yield.

[3] Slight = 400 to 499, Small = 500 to 599, Modest = 600 to 699, Moderate = 700 to 799.

[a,b,c] Values within a row with different letters are significantly different ($P < 0.05$).