Response to Implants by Finishing Steers at the Time Changes were Made in Program-fed Supplemental Protein

A.S. Leaflet R2006

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Summary

Data from three experiments involving 552 steers that were program fed supplemental protein to more closely meet their requirement were analyzed to determine if changing source or quantity of supplemental protein affected the performance of finishing steers when implanted. Comparisons were made during the beginning portions of the experiments when the cattle were implanted with estradiol benzoate and the last portion of the experiments when they were reimplanted with estradiol benzoate and trenbolone acetate. The diets were also compared during the weigh period immediately after the steers were reimplanted and again during the second weigh period after reimplanting. During the first implant period steers fed soybean meal gained faster and were more efficient than those fed urea, indicating supplementing a corn-based diet with urea did not provide adequate metabolizable protein for optimum performance. However during the second period performance was similar for steers fed soybean meal continuously, changed from soybean meal to urea or fed urea continuously. Steers fed the three diets performed similarly during the initial 21-d period or the second 21-d period following reimplanting with estradiol benzoate and trenbolone acetate. The results of these studies show that the quantity of supplemental protein fed to cattle can be significantly reduced by strategically changing from SBM-based to urea-based supplements and even a low protein urea-supplemented diet without affecting response to anabolic implants.

Introduction

The protein requirement of cattle declines with maturity because of a decrease in protein content of tissue growth. Based on this change, cattle in the feedlot can be program-fed decreasing quantities of supplemental protein to reduce overfeeding of protein and thereby reduce nitrogen lost in the manure. In previous studies (xx) we observed that stimulating growth of cattle with hormone implants increased the requirement of supplemental protein, especially during the period following administration of implants containing trebelone acetate (TBA). Three cattle feeding experiments have been conducted to evaluate strategies for program feeding of supplemental protein. In each of these experiments, the steers were implanted with TBA after adjustments in the kind and quantity of supplemental protein. The objective of this summary of the data from these three experiments was to compare performance of the steers for the period following implantation to determine if performance to the implant was altered by reducing supplemental protein prior to or at the time of the second implant.

Materials and Methods

The methods and results of the three experiments have been reported) A.S. leaflets R1774, 2002; R1832, 2003; and R2007, 2005). All the trials were done with beef steers with beginning average weights of 604, 740, and 650 lbs and were fed a total of 180, 135 and 189 days. All the diets were based on dry rolled corn and corn silage. The details of the supplemental protein strategies are given in the individual reports. In Experiment R1774 all steers were fed a soybean meal supplemented diet (SBM - 13.5% crude protein) for the first 84 days and then changed to a urea-supplemented diet for 28 days. At 112 days one group remained on the urea diet (11.85% crude protein), one group was changed to a lower level of urea (11.25% crude protein) and a third group changed to a minimal level of urea (10.0% crude protein). These steers were implanted with Component® E-S at the start of the experiment and reimplanted with Component® TE-S (the day the diets were changed from SBM to urea).

In Experiment R1832 a group of steers was fed a SBM-supplemented diet (12.4% crude protein) from start to finish. Another group was fed a urea-supplemented diet (11.7% crude protein) from start to finish. A third group was started on the SBM diet, changed to the urea diet at 42 days and continued on the urea diet for the remainder of the study (93 days). A fourth group was changed to the urea diet at 42 days and then changed to a lower protein diet supplemented with urea at 84 days and remained on the low protein diet for the final 51 days. All the steers were implanted with Component® E-S at the start of the experiment and reimplanted with Component® TE-S (20 days after the diets were initially changed from SBM to urea).

In Experiment R2007 the treatments used in Experiment 1832 were repeated except the crude protein contents of the diets were 12.3, 11.4, and 9.6 for the SBM, urea and low protein diets, respectively. All the steers were implanted with Component® E-S at the start of the experiment and reimplanted with Component® TE-S (21 days after the diets were initially changed from SBM to urea).

All cattle were fed twice per day and had free access to water. Response to the implants when cattle were fed the different protein strategies was evaluated by comparing responses of the cattle fed the different strategies during the

first part of each experiment (implant was estradiol benzoate), responses during the second part of the experiments (implant was estradiol benzoate with trenbolone acetate) and responses during the first weigh period and again during the second weigh period after the steers were reimplanted.

Results and Discussion

In Experiment R1774 there were no statistical differences in gain, feed intake or efficiency of feed utilization due to supplemental protein strategies during the first and second implant periods or during the 28-days and 29 to 56 days after the second implant (Table 1). In this experiment the three groups were each fed the SBM-supplemented diet so differences were not expected. During the 29 to 56 days after the cattle were reimplanted, the groups changed to the lower protein diets at the beginning of this period (11.25% and 10% crude protein) seemed to have reduced rate of gain, though not statistically significant. The seemingly lower gain of the lowest protein group was the result of poor performance of two pens of cattle during this 28-d period. Not including the gain of these two pens in the summary increased the average gain of the steers fed the low-protein diet to 2.86 lb/d.

Table 1. Performance of growing and finishing steers in relation to time of implants (Experiment R1774).

	SBM-U-U	SBM-U-U	SBM-U-LoU	P
First implant period				
ADG, lb	3.47	3.50	3.46	0.95
Feed/d, lb DM	14.4	15.0	14.8	0.13
Feed/gain	4.16	4.30	4.29	0.69
Second implant period				
ADG, lb	3.38	3.14	3.23	0.39
Feed/d, lb DM	20.6	20.6	20.8	0.90
Feed/gain	6.09	6.58	6.46	0.23
28 d after 2nd implant				
ADG, lb	3.56	3.24	3.27	0.59
Feed/d, lb DM	19.2	20.4	20.0	0.55
Feed/gain	5.49	6.55	6.20	0.47
28-56 d after 2nd implant				
ADG, lb	3.06	2.69	2.51	0.42
Feed/d, lb DM	20.0	19.9	19.8	0.98
Feed/gain	6.71	7.62	8.83	0.41

In Experiment R1832 steers fed the diets supplemented with SBM had higher gain and superior feed conversion compared with steers fed the urea-supplemented diet during the period of the first implant (Table 2). The urea-supplemented diet seemingly did not provide sufficient MP for steers at this stage of development. During the second implant period, there were no differences in performance of steers continued to be fed SBM vs. those changed to the urea-supplemented diets. There was no difference in performance of the steers due to source of supplemental protein during the first 21 days after reimplanting or during the period 22 to 42 days following implanting with trenbolone acetate.

Steers fed SBM had greater gains and improved feed conversion compared with those the urea-supplemented diet during the first implant period in Experiment R2007 (Table 3). As in the second experiment the urea-supplemented diet did not furnish enough MP to support optimum growth during this period. During the second implant period, there were no differences in performance related to diet. In this experiment there were no differences due to diet during the first or second 21 days periods after implanting with trenbolone acetate.

The data from Experiments R1832 and R2007 are summarized in Figures 1 and 2. During the first implant period steers fed SBM gained 8% faster and were 6% more efficient (Figure 1) indicating that urea was not providing adequate MP for the cattle during this period. However during the second implant period steers fed SBM, urea following change from SBM, or those fed urea from the beginning had similar performance (Figure 1). Seemingly the steers were consuming enough of the urea-supplemented diets to provide enough MP. Comparing more critically the performance of the steers during the first and second 21-d periods after reimplanting the steers with trenbolone acetate (Figure 2), there were no differences in performance related to kind or level of protein supplementation.

The results of these experiments are related to composition of gain of young cattle, increased rate of gain caused by the implants and quantity of feed consumed. The gain of younger cattle contains more muscle and less fat, thereby resulting in greater requirement for MP. Implants result in greater gain and gain of more muscle and less fat,

both resulting in increased requirement for MP. This was apparent with the diets used during the first period of the last two experiments. During this period cattle consume less feed (Figure 1) so steers fed diets supplying more MP (SBM-supplemented diet) had superior performance compared with those fed the urea-supplemented diet that furnished less MP. However during the second implant period, even though a more potent implant strategy was used, there were no differences in performance of the steers among the diets being compared. This can be explained by the reduced amount of muscle in the gain of cattle during the last part of the finishing period and the increased feed intake, which in itself will supply more MP.

The results of these studies show that the quantity of supplemental protein fed to cattle can be significantly reduced by strategically changing from SBM-based to urea-based supplements and even a low protein urea-supplemented diet without affecting response to anabolic implants.

Implications

Cattle feeders can use a strategy to reduce supplemental protein without affecting the response of cattle to the implant program.

Acknowledgments

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Table 2. Performance of growing and finishing steers in relation to time of implants (Experiment R1832).

	SBM	SBM-U-U	SBM-U-LoU	U	P
First implant period					
ADG, lb	4.11[a]	4.09[a]	4.05[a]	3.78[b]	0.005
Feed/d, lb DM	17.2	17.2	17.1	17.1	0.42
Feed/gain	4.21[a]	4.20[a]	4.22[a]	4.53[b]	0.003
Second implant period					
ADG, lb	3.51	3.39	3.65	3.55	0.30
Feed/d, lb DM	22.6	22.1	22.6	22.5	0.88
Feed/gain	6.45	6.54	6.22	6.34	0.23
21 d after 2nd implant					
ADG, lb	4.41	4.51	4.97	4.72	0.38
Feed/d, lb DM	22.7	21.8	22.2	22.3	0.55
Feed/gain	5.19	4.92	4.57	4.77	0.27
21-42 d after 2nd implant					
ADG, lb	2.94	2.54	2.80	2.80	0.71
Feed/d, lb DM	22.2	21.6	21.9	22.1	0.88
Feed/gain	7.83	8.75	8.52	8.08	0.79

Table 3. Performance of growing and finishing steers in relation to time of implants (Experiment R2007).

	SBM	SBM-U-U	SBM-U-LoU	U	P
First implant period					
ADG, lb	3.60[a]	3.43[ab]	3.48[ab]	3.20[b]	0.007
Feed/d, lb DM	15.6[a]	15.0[ab]	15.2[ab]	14.7[b]	0.001
Feed/gain	4.34	4.38	4.41	4.60	0.13
Second implant period					
ADG, lb	3.87	3.83	3.74	3.73	0.82
Feed/d, lb DM	24.1	23.4	23.4	22.7	0.52
Feed/gain	6.28	6.16	6.27	6.08	0.75
21 d after 2nd implant					
ADG, lb	4.42	4.13	4.15	4.24	0.69
Feed/d, lb DM	22.4	21.2	21.0	20.3	0.24
Feed/gain	5.32	5.16	5.14	4.87	0.73
21-42 d after 2nd implant					
ADG, lb	4.47	4.54	4.31	4.42	0.73
Feed/d, lb DM	24.4	23.8	23.4	23.0	0.43
Feed/gain	5.50	5.31	5.46	5.23	0.33

Figure 1. Feedlot performance of steers during the first implant period when SBM and urea-supplemented diets are fed and again during the second implant period when a SBM supplemented diet was changed to urea supplementation. Estradiol benzoate was the implant during the first period and estradiol benzoate + trenbolone acetate was the implant during the second period. Columns with different letters within a implant period are statistically significant (P < .01).

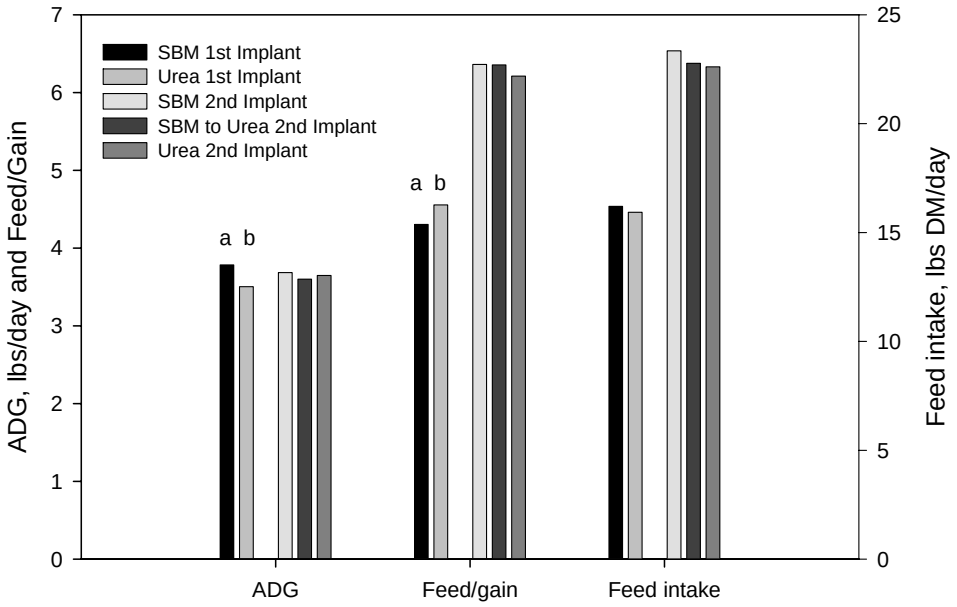

Figure 2. Performance of steers during the first and second 21-d periods following reimplanting with estradiol benzoate + trenbolone acetate. Diets included continuous feeding of SBM or urea and changing a diet supplemented with SBM to urea. There were no significant differences among diets.