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Sean P. Montgomery

J.J. Sindt

T.B. Farran

See next page for additional authors

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Effects of high-grain or high-roughage transition diets on finishing performance of cattle previously fed high-concentrate growing diets

Authors

Sean P. Montgomery, J.J. Sindt, T.B. Farran, H.J. LaBrune, R.D. Hunter, James J. Higgins, T.A. Nutsch, and James S. Drouillard

EFFECTS OF HIGH-GRAIN OR HIGH-ROUGHAGE TRANSITION DIETS ON FINISHING PERFORMANCE OF CATTLE PREVIOUSLY FED HIGH-CONCENTRATE GROWING DIETS

*S. P. Montgomery, J. S. Drouillard, J. J. Sindt,
T. B. Farran, H. J. LaBrune, R. D. Hunter,
J. J. Higgins¹, and T. A. Nutsch*

Summary

Three hundred twenty-eight crossbred beef steers previously fed high-concentrate growing diets had ad libitum access to one of two transition diets prior to initiation of the finishing phase. Transition diets consisted of 58% steam-flaked corn and 30% alfalfa hay or of 23% steam-flaked corn and 65% alfalfa hay (DM basis). Average daily gains, dry matter intakes, and feed efficiencies during the transition phase were greater for steers fed the high-grain diet than for steers fed the high-roughage diet ($P < .01$). This resulted in heavier carcass weights at the end of the subsequent finishing phase for steers fed the high-grain transition diet ($P < .05$). Average daily gains and feed efficiencies in the finishing phase were not affected by the type of diet fed during the transition phase ($P > .20$).

(Key Words: Transition Diet, Grain, Roughage, Finishing Cattle.)

Introduction

Previous research at Kansas State University has demonstrated that cattle fed high-concentrate growing diets typically exhibit lower dry matter intakes when initially provided ad libitum access to finishing diets. We speculated that lower intakes after limit feeding may be due to modifications of intake patterns during the limited growing phase. Such modifications may consist of cattle becoming conditioned to consuming their daily ration during one meal period or simply a reduced capacity to accommodate large volumes of feed when it's available ad libitum. This study was conducted to determine the effects of roughage levels in transition diets

on subsequent intakes and performance of finishing cattle previously fed high-concentrate growing diets.

Experimental Procedures

Three hundred twenty-eight crossbred beef steers averaging 575 lb were used. Steers were fed high-concentrate growing diets at 1.8% of body weight for 88 days. Then transition diets (Table 1) of 58% steam-flaked corn and 30% alfalfa hay (corn-based) or 23% steam-flaked corn and 65% alfalfa hay (alfalfa-based) were offered once daily for 14 days, and steers fed ad libitum. At the end of the transition phase, steers were stepped up to a common finishing diet, fed for 101 days, and then slaughtered. The final finishing diet (Table 1) containing 82% steam-flaked corn was offered once daily, and steers fed ad libitum. All diets provided 30 grams per ton of Rumensin[®] and 10 grams per ton of Tylan[®]. Steers were weighed approximately every 28 days throughout the 101-day finishing period.

Results and Discussion

Steers fed corn-based transition diets had greater dry matter intakes, gained more, and were more efficient ($P < .01$) during the 14-day transition phase than those fed alfalfa-based diets (Table 2). The increased weight gain of steers fed the corn-based diet was maintained throughout the 101-day finishing phase (Table 3) as suggested by the heavier

¹Department of Statistics.

carcass weights ($P < .05$) of cattle fed the corn-based diet during the transition phase. Cattle fed the alfalfa-based diet tended to have greater dry matter intakes ($P < .10$) during the finishing phase. Average daily gains and feed efficiencies were not affected by transition diet ($P > .20$).

The results of this study suggest that feeding high-grain transition diets to cattle previously fed high-concentrate growing diets will increase average daily gain and feed efficiency during the transition period. Furthermore, the advantage in weight gain will be maintained throughout the finishing phase.

Table 1. Experimental Diets (% of Dry Matter)

Ingredient	Transition Phase Diet		Finishing
	Corn-Based	Alfalfa-Based	
Steam flaked corn	57.97	22.77	81.98
Alfalfa hay	29.96	65.19	6.57
Soybean meal	2.88	2.88	2.73
Cane molasses	3.89	3.88	3.70
Tallow	2.10	2.10	2.01
Urea	1.24	1.23	1.17
Limestone	1.20	1.20	1.14
Sodium chloride	.30	.30	.28
Potassium chloride	.04	.04	.04
Ammonium sulfate	.20	.20	.19
Calcium phosphate	.12	.12	.11
Vitamin/trace mineral premix ¹	.10	.10	.08
Crude Protein, analyzed	17.8	21.4	14.5

¹Vitamin/trace mineral premix formulated to provide (total diet dry matter): 1,200 IU/lb vitamin A, .10 ppm cobalt, 8 ppm copper, .52 ppm iodine, 50 ppm manganese, .25 ppm selenium, 50 ppm zinc, 30 g/ton Rumensin[®], and 10 g/ton Tylan[®].

Table 2. Performance during the Transition Phase for Cattle Feeding ad libitum on High-Grain or High-Roughage Diets Following an 88-Day Limit-Feeding Period

Item	Transition Phase Diet		SEM ¹
	Corn-Based	Alfalfa-Based	
No. of steers	177	151	
Initial weight, lb	785	783	6.7
Final weight, lb	873 ^a	842 ^b	6.9
Dry matter intake, lb/day	18.9 ^a	18.2 ^b	.19
Average daily gain, lb	6.29 ^a	4.17 ^b	.12
Gain:feed	.332 ^a	.228 ^b	.0051

¹Pooled standard error.

^{a,b}Means within same row with uncommon superscripts differ ($P < .01$).

Table 3. Finishing Performance and Carcass Characteristics of Cattle Feeding *ad libitum* on High-Grain or High-Roughage Diets during a Transition Period between Limit Feeding and Finishing

Item	Transition Phase Diet		SEM ¹
	Corn-Based	Alfalfa-Based	
No. of steers	173	148	
Initial weight, lb	873 ^a	844 ^b	6.7
Dry matter intake, lb/day	20.3 ^c	20.7 ^d	.19
Average daily gain, lb	3.19	3.20	.040
Gain:feed	.158	.154	.0017
Hot carcass weight, lb	774 ^e	756 ^f	4.8
Ribeye area, in ²	13.1	12.8	.15
Fat thickness, in	.45	.43	.013
Kidney, pelvic & heart fat, %	2.2 ^e	2.1 ^f	.036
Yield grade 1, %	7	6	2.0
Yield grade 2, %	35	37	3.8
Yield grade 3, %	48	54	4.1
Yield grade 4 & 5, %	9 ^c	3 ^d	2.1
Marbling score ^g	SI ⁸³	SI ⁸³	4.9
USDA Choice, %	48	46	4.2
USDA Select, %	48	49	4.0
USDA Standard, %	1	3	1.0
Dark Cutters, %	3	3	1.3

¹Pooled standard error.

^{a,b}Means within same row with uncommon superscripts differ (P<.01).

^{c,d}Means within same row with uncommon superscripts differ (P<.10).

^{e,f}Means within same row with uncommon superscripts differ (P<.05).

^gSI=Slight.