1-1-2012

Complete-feed diet RAMP™ in Grain Adaptation Programs

Cody J. Schneider
University of Nebraska-Lincoln

Brandon L. Nuttelman
University of Nebraska-Lincoln

Kelsey M. Rolfe
University of Nebraska-Lincoln, krolfe2@unl.edu

William A. Griffin
University of Nebraska-Lincoln, wgriffin2@unl.edu

Galen E. Erickson
University of Nebraska-Lincoln, gerickson4@unl.edu

See next page for additional authors

Complete-feed diet RAMP™ in Grain Adaptation Programs

Cody J. Schneider
Brandon L. Nuttelman
Kelsey M. Rolfe
Will A. Griffin
Galen E. Erickson
Terry J. Klopfenstein[1]

Summary

Cattle were adapted to a common finishing diet over 22 days by decreasing RAMP (100 to 0%) and increasing finisher (0 to 100%) either as a blend in a traditional grain adaptation system or a two-ration program. The control treatment decreased alfalfa hay inclusion (45 to 7.5%) while corn inclusion increased. Steers adapted using RAMP were more efficient than traditionally adapted cattle. Using RAMP as an ingredient improved ADG compared to the traditional grain adaptation program.

Introduction

RAMP is a complete-feed starter ration containing a high level of Sweet Bran® and a minimal amount of forage, to serve as an alternative to a mixture of grain and forage for receiving cattle or adapting cattle to grain. Furthermore, many feedlots only mix two rations, a starter and a finishing ration, compared to four or five intermediate rations in a traditional adaptation system. Feedlots using a two-ration system will feed a starter and finisher to the same pen, either as a blend or two independent rations delivered separately, and gradually adapt cattle to the finishing diet by decreasing the amount of starter fed while increasing the amount of finisher. In a two-ration system, RAMP can eliminate the need to mix a starter diet. Previous research has shown that adapting cattle to grain using Sweet Bran led to increased ADG and F:G over the entire finishing period (*2009 Nebraska Beef Cattle Report,* pp. 53-55). The objective of this study was to compare performance and carcass characteristics of cattle adapted to grain using RAMP either as ingredient in transition rations or as a component in a two-ration system to cattle adapted to grain with a traditional adaptation system involving a series of rations where forage is decreased and corn increased.

Procedure

Yearling crossbred steers (n = 229; BW = 874 ± 63 lb) were blocked into three weight blocks, stratified by BW, and assigned randomly within strata to 18 feedlot pens, with 12 or 13 steers per pen. Treatments were imposed during grain adaptation (22 days) using three grain adaptation programs (Table 1). Two treatments involved decreasing RAMP inclusion (100 to 0%) while increasing inclusion of the finishing ration (0 to 100%), either delivered as independent rations in a two daily ration system (RAMP-2RS) or blended together by mixing RAMP with the various ingredients of the finishing ration as a single ration system (RAMP-1RS). The control adaptation treatment (CON) contained 25% Sweet Bran, 5% dry supplement (DM), with alfalfa hay inclusion decreasing from 45 to 7.5% while increasing the corn blend (60% high-moisture corn and 40% dry-rolled corn) from 25 to 62.5%, with the final ration serving as the common finisher for all treatments. RAMP, all step rations, and the first finishing ration contained 25 g/ton Rumensin® and 12 mg/lb thiamine (DM). Adaptation steps for RAMP-2RS were four days for first diet and three days for the six subsequent diets, with RAMP delivered as the first feeding for steps 1, 2, and 3, and the finisher as the first feeding for steps 4, 5, 6, and 7 (Table 2). Step rations for RAMP-1RS and CON were 4, 6, 6, and 6 days for steps 1, 2, 3, and 4, respectively. All cattle were offered *ad libitum* access to feed and water and fed two times per day at 0700 hours and 1300 hours.

Initially, steers were limit fed a 1:1 ratio of Sweet Bran and alfalfa hay fed at 2% of BW (DM) to minimize variation in gut fill. Weights were measured over two consecutive days (days 0 and 1) to determine initial BW. Feed refusals were collected and weighed when needed throughout the study and dried in a forced-air oven at 60°C for 48 hours to calculate DMI. All steers were implanted with Revalor-S on day 28. Following the grain adaptation period and after being on a common finishing diet for 6 days, BW were collected. Following collection of BW on day 28, cattle were switched to a second finisher, which contained 50% high moisture corn, 40% Sweet Bran, 5% wheat straw and 5% dry supplement (DM), which was formulated to provide 30 g/ton Rumensin and 90 mg/steer daily Tylan®. All cattle remained on the second finisher for the remainder of the feeding period.

Cattle were harvested at a commercial abattoir (Greater Omaha Packing, Omaha, Neb.) when each of the three weight blocks reached a similar final BW. Days on feed were 106 days for the heavy block, 120 days for the two intermediate blocks, and 141 days for the two light blocks. Hot carcass weight (HCW) and liver

(Continued on next page)

Table 1. Dietary composition (%) and DOF of control (CON) and RAMP™ 1 ration system (RAMP-1RS) adaptation methods (DM).

Days fed	1-4	5-10	11-16	17-22	23-28
Adaptation	1	2	3	4	Finisher 1
CON					
Alfalfa	45	35	25	15	7.5
HMC	15	21	27	33	37.5
DRC	10	14	18	22	25
Sweet Bran	25	25	25	25	25
Supplement[1]	5	5	5	5	5
RAMP-1RS					
RAMP	100	75	50	25	—
Alfalfa	—	1.88	3.75	5.62	7.5
HMC	—	9.37	18.75	28.13	37.5
DRC	—	6.25	12.5	18.75	25
Sweet Bran	—	6.25	12.5	18.75	25
Supplement[1]	—	1.25	2.5	3.75	5

[1]Supplement formulated to provide 25 g/ton Rumensin and 12 mg/lb thiamine on a DM.

abscess scores were obtained on the day of slaughter. Following a 48-hour chill, USDA marbling score, 12th rib fat thickness, and Longissimus muscle area (LM) were recorded. Yield grade was calculated using HCW, 12th rib fat thickness, LM, and an assumed percentage (2.5%) of kidney, pelvic, and heart fat (KPH) using the following formula: 2.5+ (2.5 x 12th rib fat) + (0.2 x 2.5[KPH]) + (0.0038 x HCW)-(0.32 x LM area). Carcass adjusted performance was calculated using a common dressing percentage (63%) to determine final BW, ADG, and F:G.

Performance and carcass characteristics were analyzed using the MIXED procedure of SAS (SAS Inst., Inc., Cary, N.C.). Pen was the experimental unit, fixed effect was treatment, and weight block was treated as a random effect. Treatment comparisons were made using pair-wise comparisons when the F-test statistic was significant at an alpha level of $P = 0.10$. Prevalence of liver abscesses was analyzed using the GLIMMIX procedure of SAS.

Results

Feedlot performance and carcass characteristics are summarized in Table 3. RAMP-1RS and RAMP-2RS decreased DMI during the adaptation period compared to CON ($P = 0.03$). Gain and F:G were similar among treatments during the grain adaptation period. During the overall finishing period, steers adapted using RAMP-1RS and RAMP-2RS were more efficient ($P < 0.01$) than cattle adapted using CON. RAMP-1RS increased ADG ($P = 0.03$) compared to CON during the finishing period. Increase in ADG for RAMP-1RS and decreased F:G for steers adapted with both RAMP treatments were due to the 22-day adaptation period, as the diet fed was the same beyond this point. In an another study where cattle were adapted to grain using Sweet Bran, increased ADG and improved F:G were observed (*2009 Nebraska Beef Cattle Report,* pp. 53-55). The authors of the previous research suggested positive gain responses associated with Sweet Bran adaptation may be due to increased diet digestibility or greater dietary energy content when Sweet Bran was used rather than alfalfa hay. However, gain responses associated with RAMP in the current study may not be attributed to either of these because gain improvements were not observed when cattle were weighed after 28 days. Difficulty associated with accurately measuring change in BW over short durations of time due to variation in gut fill may contribute to the differences. Performance improvements only during the finishing period in the current study may be due to a decrease in subclinical acidosis during the finishing period due to changes in eating behavior developed during the adaptation period. Previous research with Sweet Bran adaption indicated increased meals per day compared to control adaptation (2009 Nebraska Beef Cattle Report, pp. 56-58).

Carcass characteristics were not affected by adaptation method. Although no differences were observed for HCW ($P = 0.13$) or dressing percentage ($P = 0.13$), RAMP had numerically higher values for both. Furthermore, differences observed in ADG would suggest HCW or dressing percentage, or both, must be influenced by treatment. USDA marbling scores were similar among treatments, as well as 12th rib fat thickness, indicating steers were finished to similar endpoints. Additionally, no differences were observed in LM, calculated YG, or prevalence of liver abscesses. Grain adaptation programs using RAMP are a viable alternative to traditional adaptation programs and improve overall feedlot performance.

Table 2. Proportion of total DMI for each ration, delivered in two feedings as a two-ration system and DOF for the RAMP (RAMP-2RS) adaptation method.

Days fed	1-4	5-7	8-10	11-13	14-16	17-19	20-22	23-28
Adaptation	1	2	3	4	5	6	7	Finisher 1
RAMP-2RS[1]								
RAMP, %	100	75	55	45	35	25	15	0
Finisher 1, %	0	25	45	55	65	75	85	100

[1]RAMP delivered as AM meal for steps 1-3; finisher delivered as AM for steps 4-5.

Table 3. Feedlot performance and carcass characteristics of cattle adapted to grain using control (CON), RAMP one-ration system (RAMP-1RS), or RAMP two-ration system (RAMP-2RS) adaptation methods.

	Treatment				
Item	CON	RAMP-1RS	RAMP-2RS	SEM	*P*-value
Performance					
Initial BW, lb	877	873	873	2.1	0.21
Final BW, lb[1]	1356	1387	1374	14.0	0.13
DMI, lb/day					
28 days	26.2[a]	24.5[b]	24.7[ab]	0.75	0.09
Final	29.4	28.9	28.7	0.47	0.39
ADG, lb					
28 days	4.55	4.49	4.53	0.28	0.98
Final	3.83[a]	4.11[b]	4.01[ab]	0.12	0.09
F:G[2]	7.67[a]	7.05[b]	7.16[b]	0.16	< 0.01
Final live BW, lb	1406	1426	1407	15.2	0.38
Carcass characteristics					
HCW, lb	855	874	866	8.9	0.13
LM area, in^2	13.0	13.1	13.1	0.18	0.78
Dressed yield, %	60.8	61.3	61.6	0.35	0.13
12th rib fat, in	0.56	0.57	0.56	0.02	0.77
Yield Grade[3]	3.45	3.61	3.54	0.09	0.47
Marbling[4]	599	592	590	16.8	0.86
Liver abscess, %	7.8	10.5	10.6	—	0.79

[1]Final BW was calculated from HCW using a common dressing percentage of 63%.
[2]Statistics performed on G:F.
[3]Calculated as 2.5+ (2.5 x 12th rib fat) + (0.2 x 2.5[KPH]) + (0.0038 x HCW)-(0.32 x LM area).
[4]400 = Slight, 500 = Small, 600 = Modest.
[a,b]Within a row, means without a common superscript are different ($P < 0.05$).

[1]Cody J. Schneider, research technician; Brandon L. Nuttelman, research technician; Kelsey M. Rolfe, research technician; Will A. Griffin, research technician; Galen E. Erickson, professor; Terry J. Klopfenstein, professor; University of Nebraska–Lincoln, Department of Animal Science, Lincoln, Neb.