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Transitioning Cattle from RAMP® to a Finishing Diet With or Without an Adaptation Period

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Summary

Cattle were transitioned from RAMP to a finishing diet gradually over 28 days by decreasing RAMP (100 to 0%) and increasing finisher (0 to 100%) gradually over 4 steps, rapidly in 2 steps or abruptly without an adaptation step. Following adaptation, cattle were fed a common finishing diet for the remainder of the feeding period. Transitioning cattle from RAMP to a finishing diet in 2 steps or without an intermediate step did not affect performance or carcass characteristics compared to a more traditional 4-step program. Cattle transitioned directly from RAMP to a finishing ration had greater among day intake variation and lower DMI after the abrupt transition but had less DMI variation following a transition to final finishing diet. Cattle fed RAMP for 10 days can be transitioned to a finishing ration containing 47.5% Sweet Bran® abruptly without negatively affecting performance.

Introduction

RAMP is a complete starter ration which contains a high level of Sweet Bran and a minimal amount of forage. Adapting cattle to high grain diets with RAMP increased ADG and improved feed efficiency over the entire finishing period when compared to traditional grain adaptation. *(2012 Nebraska Beef Cattle Report*, p.85). Previous work has shown that cattle fed RAMP for 10 days can be transitioned rapidly to a 47.5% Sweet Bran finishing ration in as little as three days using 3 steps or in four days using 1 step diet without negatively affecting performance (*2013 Nebraska Beef Cattle Report,* pp. 78-79). In a metabolism study, fistulated steers were transitioned from RAMP to a finishing diet gradually over an 18-day period or abruptly in one day without an adaptation period. Steers abruptly switched to a finishing ration had lower ruminal pH but DMI was not affected by adaptation treatment. The objective of this study was to evaluate the effects of transitioning cattle directly from RAMP to a finishing ration on feedlot performance and carcass characteristics compared to more gradual grain adaptation procedures using blends of RAMP and finishing diet as step diets.

Procedure

Crossbred steer calves (n = 300; BW = 752 ± 31 lb) were received and offered *ad libitum* RAMP for 24 days then limit fed RAMP at 2% of BW (DM basis) for five days to minimize variation in gut fill. Following, limit feeding, body weights were collected over two consecutive days (days 0 and 1) to determine initial BW. Using BW measurements obtained on day 0, steers were separated into three weight blocks, stratified by BW within block, and assigned randomly within strata to feedlot pens, with 10 steers per pen.

Three treatments were imposed during the grain adaptation period (24 or 28 days; Table 1) as follows: 1) control steers (4-STEP) were gradually adapted using a 4-step system which decreased RAMP inclusion (from 100 to 0%) while increasing inclusion of finishing ration (0 to 100%) equally over 4 periods (4, 6, 6, and 6 days) by mixing RAMP with finishing ration 1 (F1; 47.5% Sweet Bran, 40% high-moisture corn (HMC), 7.5% alfalfa hay and 5% supplement, DM basis) and fed as a single diet 2) feeding RAMP for 10 days (2-STEP), followed by a 50:50 blend of RAMP to F1 for four days and F1 for 14 days; and 3) feeding RAMP for 10 days and switching directly to F1 on day 11 (0-STEP).

Finishing diet 1 was fed 6 days for 4-STEP and 14 days for 0-STEP and 2-STEP. Following F1, a second finishing diet (F2), which contained 25% Sweet Bran, 22.5% modified distillers grains with solubles, 42.5% HMC, 5% wheat straw and 5% supplement, was fed to all steers for the remainder of the feeding period (DM basis). RAMP and F1 contained 25 g/ton Rumensin® and 12 mg/lb thiamine and F2 contained 30 g/ton Rumensin and was formulated to provide 90 mg per animal daily of Tylan (DM). On day 39, pen weights were collected to evaluate performance over the adaptation period.

All steers were implanted with Revalor®-IS on day 1 and re-implanted with Revalor®-S on day 92. On day 187, cattle were transported to a commercial abattoir (Greater Omaha Packing, Omaha, Neb.) to be harvested. Hot carcass weight (HCW) and liver abscess scores were obtained on the day of slaughter. Following a 48-hour chill, USDA marbling score, 12th rib fat thickness, and LM area were recorded. Yield grade was calculated using HCW, 12th rib fat thickness, LM, and an assumed percentage (2.5%) of kidney, pelvic,

Table 1. Days RAMP, blends of a 47.5% Sweet Bran finishing ration (Finisher 1) and RAMP (Finisher 1:RAMP), finisher 1, and finisher 2 were fed over the feeding period for each treatment.

<table>
<tr><td>Days</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29-187</td></tr>
<tr><td>4-STEP</td><td colspan="4">RAMP</td><td colspan="6">25:75</td><td colspan="6">50:50</td><td colspan="6">75:25</td><td colspan="6">Finisher 1</td><td>Finisher 2</td></tr>
<tr><td>2-STEP</td><td colspan="10">RAMP</td><td colspan="4">50:50</td><td colspan="14">Finisher 1</td><td>Finisher 2</td></tr>
<tr><td>0-STEP</td><td colspan="10">RAMP</td><td colspan="14">Finisher 1</td><td colspan="5">Finisher 2</td></tr>
</table>

Table 2. Feedlot performance and carcass characteristics of cattle adapted from RAMP to a high grain diet using 0, 2, or 4 steps.

	Treatment				
Item	4-STEP	2-STEP	0-STEP	SEM	*P*-value
Performance					
Initial BW, lb	645	645	645	36.3	0.82
Final BW, lb[1]	1392	1409	1397	48.2	0.33
DMI, lb/day					
39 days	20.2	20.1	19.7	0.81	0.26
Final	21.7	22.1	21.7	0.49	0.24
ADG, lb					
39 days	4.12	4.15	4.15	0.15	0.96
Final	4.00	4.09	4.02	0.07	0.35
F:G[2]	5.41	5.41	5.38	—	0.85
Carcass traits					
LM area, in^2	14.0	14.1	14.2	0.41	0.53
12 rib fat, in	0.56	0.58	0.55	0.02	0.41
Yield Grade[3]	3.26	3.32	3.16	0.07	0.30
Marbling[4]	545	550	542	11.5	0.85

[1]Final BW was calculated from HCW using a common dressing percentage of 63%.
[2]Statistics performed on G:F, inverse of G:F presented.
[3]Calculated as 2.5+ (2.5 x 12^{th} rib fat) + (0.2 x 2.5[KPH]) + (0.0038 x HCW)-(0.32 x LM area).
[4]400 = Slight, 500 = Small, 600 = Modest.

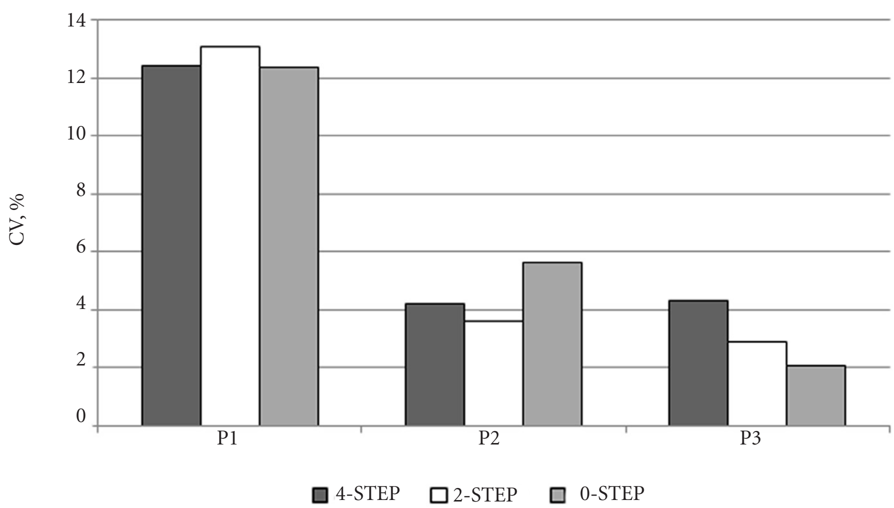

Figure 1. DMI variation (shown as CV) over three time periods (P1: all days before feeding a common finishing diet; days 1-27 or 1-28, P2: first six days of finishing diet 1, and P3: first six days on the common finishing diet). Treatments shown left to right in chart: 4-STEP, 2-STEP, 0-STEP.

and heart fat (KPH) using the following formula: 2.5+ (2.5 x 12^{th} 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 data and carcass characteristics were analyzed using the MIXED procedure of SAS. Pen was the experimental unit, treatment was a fixed effect, and weight block was treated as a random effect. Treatment comparisons were made using pairwise comparisons when the F-test statistic was significant at an alpha level of $P = 0.10$. Among day DMI variance and DMI for each pen were analyzed for three time periods (all days before feeding F1; days 1-24 or 1-28, the first six days F1 was fed, and the first six days on F2) using the MIXED procedure of SAS (SAS Inst. Inc, Cary, N.C.) Mean variance and DMI for each pen were then used to calculate coefficient of variance (CV) for DMI for each period. Prevalence of liver abscesses was analyzed using the GLIMMIX procedure of SAS using binomial distribution with the logit link function and block as a random effect.

Results

Ten steers were removed from the study for health reasons unrelated to treatment (4-STEP=5, 2-STEP = 3, 0-STEP= 2; $P > 0.69$) and are not included for analysis. Of removed steers, three were digestive deads occurring over 90 days into the feeding period (two from 4-STEP and one from 0-STEP). Adaptation program did not affect DMI ($P > 0.20$) during the adaptation period or over the entire feeding period (Table 2). Daily gain and F:G were similar ($P > 0.20$) among treatments on day 39 and over the entire finishing period. Carcass traits and incidence of liver abscesses were not affected by adaptation method ($P > 0.30$). Liver abscess prevalence was very low at 3% overall which may suggest that acidosis was minimal in this trial.

Intake variation was evaluated over three time periods as DMI variance, since DMI were different during these time periods intake variation is shown as a CV in Figure 1. Dry matter intake over the first six days of F1 (P2) was lower for 0-STEP when compared to 2-STEP ($P < 0.01$) and 4-STEP ($P < 0.01$; data not shown). Also during that time period, DMI was lower for 2-STEP when compared to 4-STEP ($P = 0.05$). Among day DMI variance for the first six days cattle were fed F1 (P2) was for lower for 2-STEP when compared to 0-STEP ($P = 0.02$). During the first six days of F2 (P3), DMI variance for 0-STEP was lower when compared to 4-STEP and numerically lower than 2-STEP ($P = 0.14$). Although, individual intake variation is masked in a pen setting, among day intake variation is one of the measures of subacute acidosis available in pen studies. Cattle transitioned directly from RAMP to a finishing ration had greater among day intake variation and lower DMI after the abrupt transition (P2) but actually had less intake variation following a transition to a final finishing diet (P3). Cattle fed RAMP for 10 days can be transitioned to a finishing ration containing 47.5% Sweet Bran abruptly without negatively affecting performance.

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