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Summary

A study evaluated the effects of replacing a diet consisting of 60% corn stover, 18% solubles, and 18% distillers grains with a complete pelleted feed containing calcium oxide (CaO) treated corn stover and distillers grains on growing cattle performance. The pelleted feed was either pair-fed to the control treatment or fed ad libitum. There were no differences in ending BW, ADG, or F:G between the control and pair-fed treatment. Feeding the pellet ad libitum *resulted in greater DMI and ADG; however, the cattle had greater F:G. The pellet has 98% the feeding value of the control treatment.*

Introduction

Until recently there have been high corn prices, which have caused farmers to convert marginal cropland from forage production to crop production. This has resulted in an increase in forage prices and a decrease in the amount of forage available for cattle to graze. The increase in crop production has also caused an increase in corn residue available to be utilized as a feed source. Pellet Technology, USA (Gretna, Neb.) has utilized the abundant corn residue and developed a complete pelleted feed consisting of a CaO treated corn stover and distillers grains to replace traditional growing diets. A previous study (*2014 Nebraska Beef Cattle Report*, pp. 62-63) evaluated the impacts of replacing a growing diet with a complete pelleted feed containing CaO treated corn stover. They found that feeding a complete pelleted feed resulted in increased ending BW, ADG, and DMI; however, the pellet negatively impacted feed conversion compared to the un-pelleted treated corn stover. Therefore, the objective of this study was to evaluate the effects of replacing a traditional growing diet with a complete pelleted feed consisting of CaO treated corn stover, dry distillers grains (DDG), and supplement on growing cattle performance.

Procedure

A 92-day growing study was conducted utilizing 360 yearling crossbred steers (initial BW = 690 ± 47 lb). All steers were limit-fed a common diet consisting of 50% roughage and 50% byproduct at 2% of BW for five days prior to trial initiation to minimize gut fill. Following five days of limit feeding, steers were weighed two consecutive days. Initial BW was calculated by averaging the two-day weights. Cattle were implanted with Ralgro® during initial processing. Steers were separated into four weight blocks based on the first-day weights, stratified by BW within block, and assigned randomly to pens. There were a total of 20 steers per pen. Pens were assigned randomly to one of three treatments. There were six pens per treatment. The first weight block had one replication, the second weight block had two replications, the third weight block had two replications, and the fourth weight block had one replication. Pen was the experimental unit.

The three treatments (Table 1) were set up in a generalized randomized block design. One of the three treatments consisted of an un-pelleted control (CON) diet containing 60% corn stover, 18% solubles, 18% modified distillers grains plus solubles (MDGS), and 4% supplement. Supplement contained limestone, supplemental minerals, and vitamins A-D-E to meet NRC requirements. Rumensin was added in the supplement to supply 200 mg/head/day. The control was formulated with the same ingredients as the completed pelleted feed; however, the corn stover was not treated and MDGS was used instead of DDG. The remaining two treatments initially consisted of a 100% complete pelleted feed containing CaO treated corn stover, DDG, solubles, and supplement (provided by Pellet Technology, USA; Gretna, Neb.) either pair-fed (Pel-PF) with the control or fed *ad libitum (*Pel-AL). However, bloat was an issue in the Pel-AL treatment (11 incidences of bloat within the first 28 days); therefore, 15% corn silage (DM basis) was added to all dietary treatments 28 days into the study. Ending BW was collected similar to initial BW, steers were limit-fed a diet consisting of 50% roughage and 50% byproduct at 2% of BW for five days. Following the limit feeding period, steers were weighed for two consecutive days. Ending BW was then calculated by averaging the two day weights. Feeding value of the pellet was calculated by the following calculation: ((Pel-PF feed efficiency − CON feed efficiency) / CON feed efficiency) x 100 + 100.

Performance data (BW, DMI, ADG, F:G) were analyzed using the MIXED procedure of SAS (SAS Institute, Inc., Cary, N.C.) with pen as the experimental unit. One steer died due to bloat and was removed from the data set. The model included treatment and block. Incidence of bloat was analyzed using the GLIMMIX procedure of SAS.

Results

There were no significant ($P > 0.50$) differences in ending BW, DMI, or ADG between the Pel-PF treatment and the CON (Table 2). Steers being fed the Pel-AL treatment had greater DMI and ADG compared with the CON and Pel-PF treatments ($P < 0.01$). However, cattle consuming the Pel-AL treatment had lower feed efficiencies ($P = 0.05$) than the CON

Table 1. Diet (DM basis) fed to growing steers to evaluate the effects of replacing a traditional growing diet with a CaO treated stover and DDG pelleted complete feed.

Ingredient	CON	Pel-AL[1]	Pel-PF[2]
MDGS	14.5	—	—
Solubles	14.5	—	—
Untreated corn stover	52	—	—
Pellet[3]	—	85	85
Corn silage	15	15	15
Supplement[4]	—	—	—
Fine ground corn	2.408	—	—
Limestone	1.116	—	—
Salt	0.300	—	—
Tallow	0.100	—	—
Supplemental minerals[5]	0.050	—	—
Vitamin A-D-E[6]	0.015	—	—
Rumensin-90[7]	0.011	—	—

[1]Pellet fed *ad libitum.*
[2] Pellet pair-fed with the control diet.
[3]Pellet contained treated corn stover, DDG, solubles, and supplement. Supplement was formulated to contain 3.524% fine ground corn, 0.300% salt, 0.100% tallow, 0.050% beef trace mineral, 0.015% vitamin A-D-E, and 0.011% Rumensin-90.
[4]Supplement supplied at 4% of dietary DM.
[5]Premix contained 10% Mg, 6% Zn, 4.5% Fe, 2% Mn, 0.5% Cu, 0.3% I, and 0.05% Co.
[6]Premix contained 1,500 IU of vitamin A, 3,000 IU of vitamin D, and 3.7 IU of vitamin E•g-1.
[7]Formulated to supply 200 mg/head/day.

Table 2. Effects of feeding a treated corn stover and distillers pelleted complete feed on growing cattle performance.

	Control	Pel-PF	Pel-AL	SEM	F-Test
Initial BW, lb	696	695	695	0.6	0.73
Ending BW, lb	956[a]	951[a]	1024[b]	4.3	< 0.01
DMI, lb/day	19.91[a]	19.95[a]	26.80[b]	0.45	< 0.01
ADG, lb/day	2.83[a]	2.79[a]	3.58[b]	0.05	< 0.01
Feed:Gain[1]	6.99[a]	7.14[a]	7.46[b]	—	0.05

[a,b]Means with differing superscripts are different.
[1]Statistics calculated on Gain:Feed.

and Pel-PF treatment. The CON and Pel-PF treatments feed efficiencies were not different. When comparing the Pel-PF treatment to the CON, the pellet had 98% the feeding value of the CON diet.

There was a difference in the number of bloats observed between the three treatments, with 9.2% of the steers on the Pel-AL treatment experiencing a bloat incident. However, 0% of the steers on the CON or Pel-PF treatment experienced bloat. The bloat issue was attributed to the small particle size of the pellet since no bloating was observed after the addition of 15% corn silage to the diet on day 28.

In conclusion, feeding the pelleted feed resulted in similar performance to the control when it was pair-fed. The Pel-AL treatment had greater DMI and ADG, but it had greater F:G. Feeding the pellet as a complete feed could be an option for growing diets if the bloat issue is resolved. We hypothesize that bloating may be reduced with a modification to the particle size of the forage in the pellet.

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