Rumen Undegradable Protein and Bambermycins Supplementation of Calves Grazing Corn Residue

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Summary with Implications

Steer calves grazing non-irrigated corn residue were supplemented with a corn residue and by-product pellet that contained either Soypass, soybean meal, or processed soybean meal at a rate of 4 lb / d. Additionally, a supplement was fed at 1 lb / d that provided 0 or 20 mg / steer daily of bambermycins (Gainpro®). There was no interaction between bambermycins inclusion and pellet type. Likewise, there was no effect of pellet type or bambermycins on ending BW or ADG. In order to maximize gain of calves grazing corn residue it is important to provide a supplement that ensures adequate levels of both energy and rumen undegradeable protein.

Introduction

The crude protein content of corn residue is not sufficient to meet the requirements of a growing animal, thus necessitating supplementation. Previous research (*2016 Nebraska Beef Report,* pp. 38-39) evaluated the effect of supplementing steers grazing corn residue with bambermycins and a pellet containing distillers grains and alkaline treated corn stover. Increasing supplement as a percent of BW resulted in a linear increase in ADG while supplementing bambermycins at a rate of 10 mg / steer daily had no effect on ADG. However, ADG of calves supplemented with the pellet was still less than reported ADG of calves supplemented with distillers grains at similar levels. Previous research has demonstrated that an increase in RUP fed to growing steers grazing corn residue increases ADG compared to supplements providing similar energy levels but lower RUP concentrations (*2016 Nebraska Beef Report,* pp. 31-32). Therefore, the objective of this study was to determine if ADG of steers grazing corn residue could be increased through an increase in rate of bambermycins fed and strategic supplementation of calves with increased levels of RUP in a pellet containing alkaline treated stover and soy byproducts.

Procedure

An 84-d corn residue grazing trial was conducted from November 10, 2015 to February 1, 2016 at the University of Nebraska-Lincoln Eastern Nebraska Research and Extension Center near Mead, NE. Sixty crossbred steers (initial BW = 489 lbs; SD = 31) were evaluated in a 2 x 3 factorial design. The first factor was inclusion of bambermycins fed at either 0 or 20 mg / steer daily. Bambermycins was included in a common soyhull-based supplement that was formulated to provide supplemental vitamins, minerals, and, depending on treatment, bambermycins and fed at 1 lb DM / d. The second factor was amount of RUP provided in the pellet when fed at 4 lb DM / d. Soypass, soybean meal (SBM), or SBM that was further processed by Pellet Technologies to increase the RUP content were included in the pellet at 40% of pellet DM with the remainder consisting of 44.5% corn stover treated with calcium oxide, and 15.5% solubles (provided by Pellet Technology, USA Gretna, Neb.). The SBM pellet was formulated to contain 7.5% RUP (as a % of DM) and provide 136 g of RUP. The Soypass and further processed SBM pellet were formulated to contain 15.3% RUP (as a % of DM) and provide 278 g of RUP. Crude protein for all 3 pellets was 26%. All cattle were individually supplemented daily with the treatment pellet and supplement. Steers were limit-fed a diet at 2% of BW consisting of 50% alfalfa and 50% Sweet Bran® for 5 days to equalize gut fill. Steers were weighed 2 consecutive days and assigned randomly to treatments after being stratified by weight. Steers were allowed continuous access to daily supplement via Calan gates. All steers were implanted with 36 mg of zeranol (Ralgro®) on d 1 of the experiment.

Stocking rate was calculated using estimates of residue amount and grazing efficiency from previous research (*2012 Nebraska Beef Report, pp. 11-12*). Estimated available forage was divided by estimated DMI (10 lb / steer daily) to determine the number of grazing days the field could support.

Ending BW was determined similarly to initial BW. Steers were limit fed a 50% alfalfa and 50% Sweet Bran® diet at 2% of BW for 6 consecutive days and weighed 3 consecutive days thereafter. Ending BW was calculated by averaging the 3 day weights.

Performance (BW and ADG) data were analyzed using the GLIMMIX procedure of SAS (SAS Institute, Inc., Cary, N.C.) with steer as the experimental unit. Effects of Gainpro and RUP source were analyzed for interaction and main effects.

Results

There was no interaction between inclusion of bambermycins and pellet type for ending BW or ADG ($P \geq 0.61$; Table 1). Similarly, there was no main effect of bambermycins inclusion on ending BW or ADG ($P \geq 0.79$) when fed at 20 mg / steer daily. Steers receiving bambermycins gained 0.76 lb / d and steers receving no bambermycins gained 0.74 lb / d. Likewise, there was no main effect of pellet type on ending BW or ADG ($P \geq 0.57$). For steers receiving the pellet with supplemental protein provided by SBM, ADG was 0.78 lb / d while steers fed a pellet with supplemental protein provided from either Soypass or further processed SBM gained 0.76 and 0.72 lb / d, respectively. Metabolizable protein has been shown to increase gains in steers grazing corn residue. The lack of a gain response from feeding an increased

Table 1. Effects of supplementing growing cattle with a corn byproduct pellet containing different protein sources with or without Gainpro.

	Gainpro			No Gainpro				*P*-Value		
Supplement[1]	SBM	PT	SP	SBM	PT	SP	SEM	Int.[2]	Gainpro	Supp.
Initial BW, lb	488	488	489	489	489	490	10.29	0.99	0.94	0.99
Ending BW, lb	553	555	548	554	550	551	10.30	0.90	0.96	0.92
ADG, lb/d	0.77	0.80	0.70	0.78	0.72	0.73	0.06	0.61	0.79	0.57

[1] SBM = soybean meal, PT = further processed SBM, SP = soypass
[2] Supplement type by Gainpro inclusion interaction.

level of RUP was unexpected and would suggest that the protein level available in all 3 pellets was sufficient for the amount of available energy.

Conclusions

Due to the limited nutrient content of corn residue, a supplement must provide additional protein and energy to optimize performance of growing calves grazing residue. These data demonstrate that additional energy may be beneficial in a supplemental pellet in order to maximize response to elevated RUP levels.

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