Evaluations of Feeding Corn Replacement Pellets on Growth Performance of Holstein Beef Steers

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Introduction

Previous lamb metabolism data has indicated that Readco® processed feedstuffs with the addition of 35% water, 25% DDGS, and 5% calcium oxide successfully increased DM digestibility over their respective controls when included at 30% of the diet DM. Therefore, a dairy beef trial was designed to test the Readco® processed feedstuffs to determine performance of growing Holstein steers when compared to positive and negative control diets.

Objectives

A 120 d study was conducted to determine growth performance of Holstein steers fed corn replacement pellets (CRP) at 50% of diet DM. Performance variables measured were feed efficiency (G:F) and average daily gain (ADG). All feedstuffs were processed through a twin screw 12.7 cm Readco® processor with the addition of calcium oxide, with the exception of the positve and negative control diets.

Materials and Methods

All feedstuffs were ground to 3.81 cm and processed through the Readco ® processor with the addition of 35% water, 25% DDGS, and 5% calcium oxide on DMB. Product exited the die plate at 27% moisture and were dried to 13% using a Belt-O-Matic® dryer. Steers (n=32) were stratified by weight to have a pen average of 182.5 ± 0.9 kg and were alloted to four pens containing eight head per pen. All steers were equiped with an individual electronic identification device and implanted with Revalor-G (40 mg TBA and 8g estradiol) prior to allotment. Individual steer intakes were monitored via GrowSafe® feed management system and were fed *ad-libitum*. Treatments are as follows: 1) Corn diet (50% DMB) with DDGS (25% DMB), 2) Corn fiber/ Wheat chaff (3:1) blend (50% DMB) with DDGS (25% DMB), 3) Wheat Straw CRP (50% DMB) with DDGS (25% DMB), and 4) Ground Wheat Straw (50% DMB) with DDGS (25% DMB). CRP diets were designed to replace an equal fraction of corn and DDGS, or the ground negtive control substrate and DDGS (Table 3). Chemical composition of diet ingredients are listed in Table 1. Differences among means for performance parameters were evaluated using the MIXED procedure of SAS (2003); individual animal was the experimental unit. Dependent variables ADG and G: F was tested against the fixed effects of diet. LS MEANS procedure of SAS (2003) was utilized to separate the means. Performance data is listed in Table 2.

Table 1. Chemical composition of diet ingredients

Ingredient	% DM	% Crude Protein DMB	% Acid Detergent Fiber DMB	% Neutral Detergent Fiber DMB	% Fat DMB
Corn Silage	46.9	8.7	14.2	31.7	3.1
WS CRP	88.1	14.9	33.5	25.6	3.3
CFWC CRP	87.1	18.8	15.8	47.7	10.2
Corn	78.2	9.8	3.4	36.4	4.0
DDGS	88.5	31.7	19.4	34.0	7.1
Ground Wheat Straw	90.0	4.9	51.4	42.8	0.7

Table 2. Performance data of Holstein steers fed CRP, corn, and ground wheat straw

Treatment	Intake (kg/d)	Average Daily Gain (kg/d)	Feed Efficiency (G:F)
Corn Diet	7.1	1.4[a]	0.20[d]
WS CRP	8.7	1.3[b*]	0.15[e]
CFWC CRP	7.9	1.4[a]	0.18[f]
Ground Wheat Straw	8.2	0.8[c]	0.10[g]

[a, b, c] P < 0.05, [b*] P = 0.10 SEM 0.10

[d, e, f, g] P < 0.05 SEM 0.01

Table 3. Replacement of Corn+DDGS with CRP+DDGS

Ingredient	% Diet DM	Ingredient	% Diet DM
Corn Silage	15	Corn Silage	15
DDGS	25	DDGS	25
Corn	50	CRP	50
Supplement	10	Supplement	10

Implications

- When Corn and DDGS were replaced with the 3:1 CFWC blend CRP with DDGS equal ADG were observed
  - The WS CRP tended to gained slightly less than the corn and 3:1 blend diets.
  - The high fiber ground WS diet was the lowest gaining among all diets.
- G:F were lower for steers fed the 3:1 blend when compared to the corn diet(P=0.04).
  - The 3:1 blend was the most efficient CRP.
  - The WS CRP was intermediate for G:F when compared to the corn diet.
  - The high fiber ground WS was the least efficient diet when compared to CRP's and corn diet.

Conclusions

- Replacing corn and DDGS with CRP and DDGS were equal in ADG for the 3:1 blend with a 10% decrease in efficiency.
- The WS CRP tended to be 7% lower in ADG than the corn and 3:1 blend diets resulting in a 25% decrease in efficiency.
- The high fiber ground WS with DDGS was the poorest performer resulting in a 43% reduction in ADG and a 50% reduction in efficiency.
- Utilization of the 3:1 blend CRP and DDGS as a replacement for corn and DDGS proved to be equal in ADG with a slight reduction in feed efficiency.