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Wet Corn Gluten Feed Levels for Steam-flaked Corn Based Finishing Diets

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Replacing steam-flaked corn with wet corn gluten feed in finishing diets had no effect on animal performance up to a level of 35%.

Summary

A finishing trial was conducted to evaluate level of wet corn gluten feed in steam-flaked corn based finishing diets. Feed efficiency and daily gain were similar among all levels (10, 20, 25, 30, and 35%, DM basis) of inclusion of Sweet Bran[®] wet corn gluten feed evaluated in this trial. These data indicate wet corn gluten feed is similar in energy content to steam-flaked corn based on animal performance.

Introduction

Feeding wet corn gluten feed (WCGF) in dry-rolled corn based diets to finish-

Table 1. Finishing diet ingredient composition.

Ingredient ^a , % DM	0%	10%	20%	25%	30%	35%
Steam-flaked corn	81.5	71.5	61.5	56.5	51.5	46.5
Wet corn gluten feed	—	10.0	20.0	25.0	30.0	35.0
Corn silage	10.0	10.0	10.0	10.0	10.0	10.0
Tallow	3.5	3.5	3.5	3.5	3.5	3.5
Dry meal supplement	5.0	5.0	5.0	5.0	5.0	5.0

ing cattle improves daily gain and feed intake while maintaining or improving feed efficiency. Based on previous work in commercial feedlots, the response when WCGF is used in steam-flaked corn diets has been different than when WCGF is fed in dry-rolled corn diets. Based on previous work at University of Nebraska (2002 Nebraska Beef Report, pp.68-71), the optimum level of WCGF is 20 to 30% (DM basis) for feed conversion in steam-flaked corn based finishing diets. The response to WCGF in commercial feedlot studies, suggested the optimum level may be lower, but few levels have been tested.

Defining the level of inclusion of WCGF in steam-flaked corn diets is important to optimizing animal performance. The objective of this research was to determine the optimum level of WCGF in steam-flaked corn finishing diets.

Procedure

One hundred ninety-two crossbred steer calves (658 lb) were stratified by weight and assigned randomly to 1 of 24 pens (8 steers/pen). Pens were assigned randomly to 1 of 6 treatments. Treatments were assigned based on six levels of Sweet Bran[®] wet corn gluten feed. Levels were 0, 10, 20, 25, 30, and 35% (DM basis) of wet corn gluten feed. All diets were formulated to contain a minimum of 14.0% crude protein, 0.70% calcium, 0.28% phosphorus, 0.60% potassium, 31 g/ton Rumensin, and 10 g/ton Tylan (DM basis; Table 1). Supplements were fed in two phases to supply UIP early in the finishing stage when calves may be deficient in MP. Phase 1, UIP was supplemented to calves using feather and blood meal (50:50) at 1% of the dietary DM. Phase 2, UIP was

Table 2. Effect of WCGF level in steam-flaked corn based diets on animal performance and carcass characteristics.

Item	Treatments						SEM	P-Value
	0%	10%	20%	25%	30%	35%		
Days on feed	151	151	151	151	151	151		
Initial wt., lb	657	659	659	656	661	658	1	0.22
Final wt., lb ^a	1312	1321	1352	1329	1317	1326	14	0.47
DMI, lb/day	20.0 ^b	20.8 ^{bc}	21.3 ^c	20.8 ^c	20.7 ^{bc}	21.4 ^c	0.3	0.07
ADG, lb	4.33	4.39	4.59	4.46	4.35	4.43	0.10	0.47
Feed:gain	4.62	4.73	4.65	4.68	4.76	4.83		0.25
Carcass weight, lb	826	832	852	837	830	836	9	0.47
Marbling score ^d	524	526	514	517	528	534	14	0.92
Choice or above, %	79.9	67.4	61.1	53.1	73.2	81.2	9.1	0.25
Fat thickness, in	0.54	0.54	0.58	0.56	0.56	0.58	0.03	0.87
Yield grade	2.8	2.7	2.7	2.8	2.9	2.8	0.1	0.81

^aFinal weight calculated as hot carcass weight divided by 0.63.

^{b,c}Means within a row with unlike superscripts differ (P < 0.10).

^dMarbling score: 400 = Slight 0, 450 = Slight 50, 500 = Small 0, etc.

replaced with urea when the cattle were estimated to weigh 875 lb. Corn silage was included in all diets, including step-up diets, at 10% (DM basis). Step-up diets contained 35, 25, 15 and 5% alfalfa hay (DM basis) replacing the corn in each treatment diet and fed for 7, 8, 7 and 7 days, respectively.

Initial weights were determined as the average of two consecutive early morning weights before feeding at the initiation of the trial. Steers were fed once daily and allowed ad libitum access to feed and water. Steers were implanted with Synovex-C on day 1 and reimplanted with Revalor-S on day 53. Cattle were fed for 151 days and harvested at a

commercial packing plant where carcass data were collected. Hot carcass weight was collected the day of harvest with fat, marbling score, and yield grade data collected following a 24-hour chill.

Results

Overall cattle performance was exceptional for this experiment, presumably due to a mild winter/spring with no mud. Final weights, ADG and feed conversion were similar among treatments (Table 2). Dry matter intake was lower ($P < 0.10$) for 0% WCGF compared to levels of 20, 25, and 35% WCGF. Dry matter intake was not statistically differ-

ent for treatments containing WCGF. Hot carcass weight, marbling, fat thickness and YG were similar among treatments. These data would suggest levels up to 35% WCGF can be fed with steam-flaked corn based diets though there would be a tendency for a decrease in efficiency at 35% WCGF level. These data suggest Sweet Bran® WCGF has the feeding value similar to steam-flaked corn.

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Effects of Corn Processing Method and Crude Protein Level with the Inclusion of Wet Corn Gluten Feed on Finishing Steer Performance

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More intensively processed corn, such as dry fine-grinding, early ensiling of high-moisture, or steam-flaking corn improved feed conversion by 3.7, 7.8, or 11.7%, respectively, compared to dry-rolling in finishing diets that contained wet corn gluten feed.

Summary

Three hundred twenty crossbred steer calves were used to evaluate corn processing method and crude protein level in finishing diets that included wet corn gluten feed. There was no response due to crude protein level (14 vs 15%) observed in this trial. As corn processing method became more intensive (fine-grinding, high-moisture ensiling, and

steam-flaking corn) compared to dry-rolling, daily intake was reduced. Daily gain was similar across corn processing methods. Feed efficiency and cost of gain improved as corn processing method intensity increased.

Introduction

Using products such as wet corn gluten feed (WCGF) to replace corn in finishing diets has been shown to improve feed intake and daily gain while maintaining or improving feed efficiency. Most of this work has been done with dry-rolled corn replacement, although it has been shown that there are improvements in feed efficiency when corn is more intensely processed and WCGF is included in finishing diets (2001 Nebraska Beef Report, pp. 59-63) fed to yearlings or calves.

Research at Nebraska has shown that steam-flaked corn and high-moisture corn have similar ruminal starch digestion, with both being greater than dry-rolled corn (Cooper et al., 2002 JAS). However, postruminal starch digestion

was higher for steam-flaked corn than high-moisture or dry-rolled corn. High-moisture corn used in the previous trial was rolled and stored in a bunker at 29% moisture. Harvesting high-moisture corn at an earlier stage and grinding to a smaller particle size may provide some opportunity to increase starch digestion postruminally. However, when fed to cattle, decreasing particle size raises some concerns about acidosis and separation in the feedbunk. Inclusion of WCGF alleviates these concerns (1995 Nebraska Beef Report, pp. 34-36).

By controlling acidosis (the increasing ruminal pH) with the inclusion of WCGF, microbial efficiency presumably increases. An increase in microbial efficiency will increase degradable intake protein (DIP) requirements in finishing diets. Previous work (2001 Nebraska Beef Report, pp. 54-57) illustrated more intensive corn processing methods (high-moisture and steam-flaked corn), compared to DRC, increased DIP requirements. Finishing diets that contain WCGF and have

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