Comparing Wet and Dry Distillers Grains Plus Solubles for Yearling Finishing Cattle

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Summary

Long yearling steers were used to compare wet distillers grains plus solubles (WDGS) and dried distillers grains plus solubles (DDGS) to a corn control (CON) when included at 35% of diet DM in finishing diets. Final BW was heavier (P = 0.03) for WDGS and DDGS as a result of increased (P < 0.01) ADG. Intakes were not different (P = 0.33) among treatments. Cattle fed WDGS were most efficient, DDGS intermediate, and CON the least efficient. The feeding values were 31.3 and 21.5% greater for WDGS and DDGS than corn, respectively.

Introduction

A University of Nebraska–Lincoln meta-analysis (*2011 Nebraska Beef Cattle Report,* pp. 40-41) determined the feeding value of WDGS compared to dry rolled corn (DRC) or high-moisture corn (HMC) blended with DRC (corn blend) was greater for yearlings fed in the summer than for calf-feds fed in the winter. The feeding values calculated for WDGS in this meta-analysis when fed to calf-feds was 124% the value of corn blend and was 131 to 146% the value of corn blend when fed to summer yearlings, depending on inclusion level. Additional research compared 35% WDGS or DDGS to corn blend in calf-feds and reported 130 and 111% the feeding value of corn blend for WDGS and DDGS, respectively (*2011 Nebraska Beef Cattle Report,* pp. 48-49). Therefore, the objective of this study was to compare the feeding value of WDGS and DDGS to corn blend in long yearling steers.

Procedure

Crossbred, long yearling steers (n = 171; 797 ± 66 lb) were utilized in a randomized block design beginning mid-August and ending mid-January. Steers were blocked by BW, stratified within block, and assigned randomly to pen (21 pens; 8 or 9 steers/pen). Pens were assigned randomly to one of three treatments (7 replications/treatment) that consisted of: 1) corn-based control (CON); 2) wet distillers grains plus solubles (WDGS); and 3) dried distillers grains plus solubles (DDGS). Wet distillers grains plus solubles (WDGS; 34.6% DM) or dried distillers grains plus solubles (DDGS; 88.2% DM) were purchased from the same plant and were included in the diets at 35% (DM basis). Distillers grains plus solubles (DG) replaced corn blend. Basal ingredients consisted of a HMC and DRC blend fed at a 1:1 ratio (DM basis), 7.5% grass hay, and 5% dry supplement (DM basis; Table 1). Diets were formulated to contain at minimum 13.0% CP, 0.6% Ca, 0.15% P, and 0.6% K. Urea was included in CON supplement and all supplements contained 30 g/ton (DM) monensin and 90 mg/head/day tylosin (Elanco Animal Health, Greenfield, Ind.).

Prior to initiation of the study, cattle were limit fed a common diet at 2.0% BW that contained 47.5% wet corn gluten feed, 47.5% alfalfa hay, and 5.0% supplement for five consecutive days to eliminate variation due to gut fill. Following the limit feeding period, steers were individually weighed on day 0 and day 1, and the average of the two weights was used to obtain an accurate initial BW. Steers were adapted to the finishing diet by replacing equal parts of grass hay and alfalfa hay with corn blend for steps 1, 2, and 3 (3, 4, and 7 days, respectively). Step 4 included 7.5% grass hay and 5.0% alfalfa hay for seven days. On day 22, alfalfa hay was removed and steers were fed their respective finishing diet. Steers were implanted on day 36 with Revalor®-S. Cattle were fed once daily, and feed refusals were collected and weighed when needed throughout the trial and dried in a forced-air oven at 60°C for 48 hours to calculate DMI. Steers were harvested at a commercial abattoir (Greater Omaha Pack, Omaha, Neb.) on day 148. On the day of slaughter HCW were collected, and following a 48-hour chill, USDA marbling score, 12th rib fat depth, and LM area were recorded. A common dressing percentage of 63% was used to calculate carcass adjusted performance to determine final BW, ADG, and F:G.

The difference in gain efficiency (inverse of F:G) between the different types of DG was divided by the gain efficiency of the DDGS treatment and the inclusion level of DG (35% DM) to

Table 1. Diet composition.

	CON[1]	WDGS[1]	DDGS[1]
HMC[2]	43.75	26.25	26.25
DRC[2]	43.75	26.25	26.25
WDGS[2]	—	35.0	—
DDGS[2]	—	—	35.0
Grass Hay	7.5	7.5	7.5
Supplement[3]	5.0	5.0	5.0

[1]CON — Control diet with no distillers grains plus solubles; WDGS — Wet distillers grains plus solubles included at 35% of diet DM; DDGS — Dried distillers grains plus solubles included at 35% diet DM.
[2]HMC — high moisture corn; DRC — Dry rolled corn; WDGS — wet distillers grains plus solubles; DDGS — dried distillers grains plus solubles.
[3]Supplements formulated to provide minimum dietary levels of 13.0% CP, 0.6% Ca, 0.15% P, 0.6% K. Contained 30 g/ton (DM) of monensin and 90 mg/head/day tylosin.

Table 2. Growth performance and carcass characteristics.

	Treatments[1]				
	CON	DDGS	WDGS	SEM	*P*-Value
Performance					
Initial BW, lb	810	810	809	1	0.44
Live Final	1476[a]	1525[b]	1531[b]	11	< 0.01
Final BW[2], lb	1424[a]	1488[b]	1497[b]	10	< 0.01
ADG[3], lb	4.15[a]	4.58[b]	4.65[b]	0.07	< 0.01
DMI, lb/d	28.5	29.2	28.8	0.4	0.33
F:G[4]	6.85[a]	6.34[b]	6.17[c]	—	< 0.01
Carcass Characteristics					
HCW, lb	897[a]	937[b]	943[b]	6	< 0.01
Dressing Percent	60.9[a]	61.6[b]	61.7[b]	0.2	0.03
Marbling Score[5]	608	611	618	12	0.81
12th rib fat, in.	0.55	0.58	0.60	0.02	0.24
LM, area in.^{2}	13.0	13.1	13.2	0.1	0.09

[abc]Within a row means without common superscript differ ($P \leq 0.05$).
[1]CON — Control diet with no distillers grains; WDGS — Wet distillers grains plus solubles included at 35% of Diet DM; DDGS — Dry distillers grains with solubles included at 35% of diet.
[2]Calculated from hot carcass weight, adjusted to a common dressing percentage of 63.0%.
[3]Calculated using carcass adjusted final BW.
[4]Analyzed as gain:feed, reciprocal of feed conversion (F:G).
[5]Marbling score: 400 = Slight^{0}; 450 = Slight^{50}; 500 = Slight^{0}, etc.

determine the differences in feeding value between types of DG. The same calculations were used to calculate the improved feeding value of each DG compared to the CON treatment.

Data were analyzed using the MIXED procedure of SAS (SAS Inst. Inc., Cary, N.C.). The study was analyzed as a randomized block design. Block was considered to be fixed, and pen was the experimental unit. Differences were considered significant when $P \leq 0.05$.

Results

Steers fed DDGS or WDGS had greater ADG ($P < 0.01$) than CON fed cattle, but DDGS and WDGS were not different ($P = 0.47$; Table 2). Increased ADG resulted in heavier ($P < 0.01$) final BW for WDGS and DDGS compared to CON. There was no difference ($P = 0.33$) for DMI among treatments. Similar DMI and increased ADG resulted in diets containing DG having improved ($P < 0.01$) F:G values compared to CON, and cattle fed WDGS were more efficient than DDGS. Cattle fed DDGS or WDGS also had greater ($P < 0.01$) HCW than CON. There were no differences among treatments for marbling score, back fat thickness, or LM area ($P \geq 0.09$).

Feeding value calculations suggest diets containing WDGS and DDGS to be 131 and 122% the feeding value of corn blend, respectively. The feeding value for WDGS was 109% that of DDGS. The current feeding value for WDGS is nearly identical to the meta-analysis and calf-fed study which reported improved feeding values greater than 130% that of the corn blend in diets containing 30-40% WDGS. Contrasting to both of these previous reports, the improvement for DDGS compared to corn blend in this study is greater than the 111% and the 112% feeding value reported for the calf-fed study (*2011 Nebraska Beef Cattle Report,* pp. 48-49) and the meta-analysis (*2011 Nebraska Beef Cattle Report,* pp. 40-41), respectively. These differences in improved feeding values between studies could be due in part to the DG within each study being produced by different ethanol plants. These results reiterate that including DG in finishing diets will improve cattle performance compared to the corn blend. Also, the greater feeding value for WDGS compared to DDGS, suggests the feeding value of WDGS is reduced during the drying process.

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