2007

Comparison of Gain and Carcass Traits from Pasture- and Feedlot-Finished Beef Steers Supplemented with Distillers Grain Co-Products

Roxanne Knock
Iowa State University

Allen H. Trenkle
Iowa State University

Donald C. Beitz
Iowa State University, dcbeitz@iastate.edu

Elisabeth J. Huff-Lonergan
Iowa State University, elonerga@iastate.edu

Steven M. Lonergan
Iowa State University, slonerga@iastate.edu

See next page for additional authors

Comparison of Gain and Carcass Traits from Pasture- and Feedlot-Finished Beef Steers Supplemented with Distillers Grain Co-Products

Abstract
As the ethanol and renewable fuel industries grow, the availability of distillers grains and other co-products continues to increase. These co-products are valuable feedstuffs for ruminants because of their high protein content and also their high fiber content. However, as more acres are dedicated to corn production, less pasture will be available for grazing livestock and less corn may be available for use as feed. As such,supplementing pasture-fed cattle with distillers grains may be an option for some producers to utilize. Therefore, the objective of this research was to evaluate pasture-finishing steers with supplementation of a distillers co-product.

Keywords
Animal Science

Disciplines
Agricultural Science | Agriculture | Animal Sciences

Authors
Roxanne Knock, Allen H. Trenkle, Donald C. Beitz, Elisabeth J. Huff-Lonergan, Steven M. Lonergan, and James R. Russell

Comparison of Gain and Carcass Traits from Pasture- and Feedlot-Finished Beef Steers Supplemented with Distillers Grain Co-Products

Roxanne Knock, graduate assistant
Allen Trenkle, distinguished professor
Don Beitz, distinguished professor
Elisabeth Huff-Lonergan, associate professor
Steven Lonergan, associate professor
Jim Russell, professor
Department of Animal Science

Introduction

As the ethanol and renewable fuel industries grow, the availability of distillers grains and other co-products continues to increase. These co-products are valuable feedstuffs for ruminants because of their high protein content and also their high fiber content. However, as more acres are dedicated to corn production, less pasture will be available for grazing livestock and less corn may be available for use as feed. As such, supplementing pasture-fed cattle with distillers grains may be an option for some producers to utilize. Therefore, the objective of this research was to evaluate pasture-finishing steers with supplementation of a distillers co-product.

Materials and Methods

British-breed beef steers (n=48) averaging 814 lb were assigned to one of two diets on April 18, 2006. A typical feedlot ration containing 10% wet distillers grain was fed to the steers assigned to the feedlot diet (Table 1). Feedlot steers were housed at the Iowa State University (ISU) Beef Nutrition Farm in Ames, IA in outside lots and fed once daily. The steers assigned to pasture-finishing continuously grazed bromegrass pasture and were supplemented initially with 10 lb/head daily of a pellet containing dried distillers grain (Table 2). On July 13, 2006, supplement was increased to 15 lb/head daily due to decreasing forage availability and quality. Pasture-finished steers also had access to a vitamin/mineral block with Rumensin®. Pasture-finished steers were housed at the Western Research and Demonstration Farm (Castana, IA) and received supplement once daily. All steers were implanted with Component TE-S prior to beginning the study. Steers were weighed and evaluated by ultrasound every 21 days. After 12 weeks on the respective feeding regimens, ultrasound image evaluation indicated that a number of steers were nearing 0.5 in. of 12th rib fat. At this time, steers were designated to 1 of 3 harvest dates (3 weeks apart) based on estimated 12th rib fat thickness. At 24 hours after harvest, individual carcass data were collected, consisting of USDA marbling score, 12th rib fat thickness (used for the preliminary yield grade), ribeye area, hot carcass weight, percentage kidney, pelvic, and heart fat, and final yield grade.

Results and Discussion

Weight gain. Steers had similar weights (P=.07) upon dietary treatment assignment. Feedlot steers weighed 805 lb and pasture steers weighed 825 lb at the onset of the study. At harvest, feedlot steers were heavier (P=.04; 1,285 lb) than pasture-finished steers (1,239 lb). This resulted in greater average daily gain (ADG; P<.001) for the feedlot-finished steers (3.84 lb/day) than the pasture-finished steers (3.32 lb/day). Because equal numbers of steers from each diet were not harvested on each harvest date, average days on feed for each diet were calculated. Feedlot steers and pasture-finished steers averaged 132 and 130 days on feed, respectively.

Carcass characteristics. At harvest, pasture-finished steers had less 12th rib fat as well as less kidney, pelvic, and heart fat than the feedlot-finished steers (Table 3). Additionally, pasture-finished steers had lower (P=.01) marbling

scores (345) than the feedlot-finished steers (390).

Future analyses. Another portion of this study included the use of 25-hydroxyvitamin D_3 to improve beef tenderness. However, analyses for that portion of the study have not yet been completed. Further analyses to be conducted include evaluation of fatty acid profile, beef tenderness, and sensory attributes.

Conclusions. The pasture-finished steers did not exhibit similar average daily gains to feedlot steers, which was expected. Nonetheless, the pasture-finished steers gained very well. Distillers co-products provide high quality protein without the starch of corn and thus do not result in the negative associative effects that can occur when supplementing cattle on pasture with corn grain. Feed efficiency was not calculated in this study because of the difficulty in attaining an accurate measure of feed intake for the pasture-finished steers. This study demonstrates that it is possible to finish steers on pasture by supplementing with distillers co-products without substantially increasing the time needed to reach marketable weights compared with steers finished in the feedlot.

Acknowledgments

Appreciation is extended to Wayne Roush, Don Hadden, Don Hummel, and the summer interns at the Western Research Farm, and also Rod Berryman and the Beef Nutrition Farm staff for their hard work and contributions to this research. The authors acknowledge the National Cattlemen's Beef Association (NCBA) for funding this research.

Table 1. Composition of feedlot-finishing diet.

Feed Ingredient	% of diet, DMB[a]
Dry rolled corn	72.965%
Wet distillers grain	10.000%
Corn silage	9.955%
Ground hay – brome	2.500%
Urea	1.474%
Potassium chloride	0.966%
Limestone	0.966%
Salt	0.300%
Vitamin A	0.080%
Trace minerals	0.024%
Rumensin 80	0.020%
Molasses	0.750%
Total	100.000%

[a]DMB = Dry Matter Basis

Table 2. Composition and calculated analysis of a by-product feed mix.

Composition	%
Dried distillers grain with solubles	50.0
Soy hulls	25.0
Wheat midds	20.9
Molasses	2.5
Calcium carbonate	1.6
Total	100.0
Calculated Analysis	
Dry matter, %	90.1
Crude protein, %	21.8
Calcium, %	0.94
Phosphorus, %	0.67
NE m	0.91
NE g	0.61
TDN, %	85.9

Table 3. Carcass characteristics of pasture- and feedlot-finished steers.

Carcass Characteristic	Feedlot	Pasture	SEM	P-value
Hot carcass weight, lb	768	755	14.7	0.3230
LM area, $in.^2$	13.6	13.1	2.8	0.1746
Fat thickness, in.	0.34[a]	0.24[b]	0.03	< 0.0001
Kidney, pelvic, and heart fat, %	1.83[a]	1.64[b]	0.06	0.0108
Final yield grade	2.4	2.2	0.2	0.1014
Marbling score[a]	390[a]	345[b]	31	0.0142
% Choice	54	25		

[a]Marbling score: 300=Slight[00], 400=Small[00], 500=Modest[00].

[bc]Numbers within a row with different superscript letters differ.