Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 457

1999

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Abstract

Crossbred beef heifers (avg wt 653 lb) were used in a feeding experiment to determine the relative feed value of dried paunch content, two separate vegetable processing by-products, and combinations of by-products with dryrolled corn. Consumption of the vegetable byproduct diets, both of which contained a high percentage of fat, was less than expected. Performance of cattle fed the by-product diets was less than that of cattle fed high-energy diets comprised of corn. However, when combined with corn, the vegetable by-product yielded performance similar to that of corn alone.

Keywords

Cattlemen's Day, 1999; Kansas Agricultural Experiment Station contribution; no. 99-339-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 831; Beef; Paunch; Vegetable by-product; Growing cattle

DEHYDRATED PAUNCH AND VEGETABLE BY-PRODUCTS FOR GROWING BEEF CATTLE

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Summary

Crossbred beef heifers (avg wt 653 lb) were used in a feeding experiment to determine the relative feed value of dried paunch content, two separate vegetable processing by-products, and combinations of by-products with dry-rolled corn. Consumption of the vegetable by-product diets, both of which contained a high percentage of fat, was less than expected. Performance of cattle fed the by-product diets was less than that of cattle fed high-energy diets comprised of corn. However, when combined with corn, the vegetable by-product yielded performance similar to that of corn alone.

(Key Words: Paunch, Vegetable By-Product, Growing Cattle.)

Introduction

Paunch content derived from beef cattle slaughter represents a significant waste disposal issue for commercial packers in the High Plains. Large volumes of material with high moisture content, high biological oxygen demand, and objectionable odor are produced. Disposal of these and other byproducts, including vegetable processing wastes, is costly. High moisture content makes transportation over long distances impractical. Dehydration lowers transportation costs and improved storage characteristics but is energy intensive and costly. To justify that added cost, we need to identify feeding applications that recognize optimum nutritive value. In this study, we evaluated dried paunch contents and vegetable wastes as ingredients in limit-fed, high-energy rations for growing beef cattle.

Experimental Procedures

Two hundred sixteen crossbred heifers (653 lb) were vaccinated against common viral and bacterial diseases, treated for internal and external parasites, implanted with zeranol, and fed a common receiving diet (ad libitum) for 4 to 6 weeks prior to starting the experiment. On day 1, heifers were weighed individually to obtain weights for allocation to treatments. On day 2, animals were stratified by weight and randomly allotted, within strata, to six diets fed at 2.0% of body weight (dry matter basis).

Pressed paunch contents were dehydrated in a gas-fired rotary drum dryer, then pelleted through a 5/16-in. die. Two different vegetable by-product blends were used. The first (High-fat Veg), which included cull vegetables, vegetable peels, breading wastes, and filter sludge, was dehydrated in a rotary dryer and pelleted. The second differed from the first only in that it included approximately 20% soybean hulls (Veg/Soyhull).

Compositions of the experimental diets are summarized in Table 1. Rations were formulated to contain approximately 16% crude protein, 0.8% calcium, 0.4% phosphorus, 0.7% potassium, 30 g/ton Rumensin®, and 10 g/ton Tylan® on a dry matter basis. All diets were fed once daily.

Cattle were placed into pens of six head each, with six pens per treatment. Cattle were acclimated to their respective diets for the first 13 days and then reweighed to obtain a starting weight. The preliminary adjustment period made it feasible to substantially reduce confounding from gastrointestinal tract fill. Interim weights were taken

at approximately 2-week intervals, and amounts of feed offered to each pen were adjusted to reflect changes in body weight. Differences in average daily gain, feed consumption, and feed efficiency were compared for the period between days 13 and 84.

Results and Discussion

Performance of growing heifers is shown in Table 2. Calves in all treatments lost weight during the initial 13-day acclimation period, which is consistent with changes in gut fill after being placed on limited intakes. Consequently, performance during the final 71 days provides for a more accurate assessment of tissue deposition and performance differences.

Cattle fed diets containing a high percentage of either of the vegetable by-products failed to consume their entire daily ration, particularly those fed High-fat Veg. We also observed a high incidence of bloating (including one death) among cattle fed the vegetable by-products. Bloating was most prevalent, and most severe, on High-fat Veg.

Daily gains for cattle fed the Veg/Soyhull by-product were only 60% of those for cattle fed the corn diet, and as expected, efficiency also was poorer. Cattle fed the High-fat Veg by-product gained less but also consumed far less feed than cattle on the corn treatment; consequently, efficiencies of those groups were not different.

The mixture of corn and Veg/Soyhull by-product yielded the most rapid gain and greatest feed efficiency. The 50:50 mixture of the corn diet and the Veg/Soyhull diet exhibited a classic positive associative effect. Gain was 30% faster and 35% more efficient than the average of the two separate diets. Feed intake was not depressed in the mixed diet, which may explain the improved performance relative to the Veg/Soyhull diet.

Cattle fed the dehydrated paunch content diet had the lowest gains and poorest feed efficiencies, but we observed no problems with its consumption. Combining corn with paunch content improved gain and efficiency relative to paunch content alone, but we saw no evidence of a positive associative effect.

Table 1. Compositions of Experimental Diets

Item	Corn	Veg/ Soyhull	High-Fat Veg	Paunch Content	Veg/ Soyhull +Corn	Paunch +Corn
Dry-rolled corn	67.98				33.99	33.99
Ground alfalfa hay	15.00				7.50	7.50
Dehydrated vegetable by-product		79.39			39.70	
Dehy, high-fat vegetable by-product			79.93			
Dehydrated paunch content				82.98		41.49
Soybean meal	10.42	13.78	13.31	10.42	12.10	10.42
Urea	.66	.66	.66	.66	.66	.66
Cane molasses	4.00	4.00	4.00	4.00	4.00	4.00
Limestone	1.13	1.13	1.13	1.13	1.13	1.13
Calcium phosphate	.38	.61	.54	.38	.49	.38
Salt	.33	.33	.33	.33	.33	.33
Mineral/vitamin premix	.10	.10	.10	.10	.10	.10

Table 2. Performance of Growing Cattle Limit-Fed Packing House and Vegetable Processing By-Products

Item	Corn	Veg/ Soyhull	High-Fat Veg	Paunch Content	Veg/Soyhull +Corn	Paunch +Corn	SEM
Days 1-13							
Daily gain, lb	-.69[a]	-.61[a]	-3.63[b]	-2.60[b]	-1.3[a]	-2.45[b]	.37
Dry matter intake, lb	12.07[a]	11.19[a]	10.05[b]	12.03[a]	12.09[a]	12.13[a]	.34
Days 13-84							
Daily gain, lb	2.82[a]	1.70[b,c]	2.02[b]	1.40[c]	2.93[a]	1.93[b]	.11
Dry matter intake, lb	14.48[a]	12.86[b]	10.97[c]	13.24[b]	14.51[a]	13.80[a,b]	.40
Feed efficiency	5.12[a]	7.60[b]	5.44[a]	9.50[c]	4.95[a]	7.10[b]	.31

[a,b,c]Means in the same row with like superscripts are not different (P>.05).