Micronized Wheat for Beef Cattle

Jerry Aimone and Donald G. Wagner

Story in Brief

Two methods of processing wheat in high concentrate rations for finishing beef cattle were compared. The treatments studied were: 1) dry rolled wheat (DRW) and 2) micronized wheat (MW). Two feedlot trials were conducted. In trial 1, 30 steers weighing an average of 734 pounds were fed for 112 days. Trial 2 was a 171 day feeding trial with 36 steers averaging 488 pounds.

In trial 1, average daily intakes were 20.0 and 20.6 lb. on the DRW and MW treatments, respectively. In trial 2, intakes were 15.8 and 17.2 lb. on the same treatments. Average daily gains were 3.46 and 3.65 lb. on the DRW and MW in trial 1 and 3.19 and 3.50 lb. in trial 2. The pounds of feed required per pound of gain for DW and MW were: trial 1, 5.90 and 5.69 lb.; trial 2, 4.95 and 4.92 lb. The values for daily intake and daily gain were significantly greater ($P<.01$) on MW in trial 2.

Introduction

Wheat has been used in the past and may be used in the future as a source of energy in feedlot rations. In recent years, wheat prices have been competitive at times with other grains for livestock use.

Since grain may constitute up to 90 percent of feedlot finishing rations and represents a large portion of the total cost of gain, feedlot operators should be concerned with the question of how to use grain most efficiently. Even small improvements are more meaningful than ever due to the high price of grain.

Data are limited concerning the effects of different processing methods, primarily dry heat, on the nutritive value of wheat. The purpose of this experiment, therefore, was to determine the value of micronizing wheat for feedlot cattle.

Materials and Methods

Two feedlot trials were conducted to study the effect of dry rolling wheat (DRW) or micronizing wheat (MW) in 85 percent wheat rations. In trial 1, 30 Angus x Hereford feeder steers were used. They were gradually adapted to the high wheat ration. After the two-week adaptation

period they were randomly allotted to the two treatments with three animals per pen and five pens per treatment. The average initial weight of the steers was 734 lb.

Trial 2 included 36 Angus x Hereford feeder steers averaging 488 lb. Following adaptation the steers were randomly allotted to the treatments with three animals per pen and six pens per treatment. The treatments used in the two trials were: 1) DRW and 2) MW. The wheat used was of the Triumph variety, a hard winter wheat. Feed was fed once daily in an amount to allow feed to be available until the next feeding.

In trial 2, all steers were initially implanted with Synovex-S and then midway through the trial, one-half of the animals were reimplanted.

Once during each trial rumen samples were taken from each animal; pH values were taken immediately, and a small amount was saved for VFA analysis.

Initial and final shrunk weights were obtained by holding the animals off feed and water for 12 hours. At the end of the feeding trials, carcass and liver data were collected from each steer.

Results and Discussion

The ration composition for both trials is presented in Table 1. The only difference in the rations was the method of processing: the wheat being either dry rolled or micronized. The proximate analysis data are presented in Table 2. The moisture content for the MW was 8.33 percent compared to 11.33 percent for DRW in trial 1. In trial 2, the moisture content of MW was 5.27 percent compared to 10.43 percent for DRW.

The feedlot performance and carcass data are denoted in Table 3. In trial 1 (112 days), there were no significant differences ($P>.05$) between

Table 1. Ration Composition[1] (Trials 1 & 2)

Ingredient	Percent
Wheat	85.00
Cottonseed hulls	5.0
Alfalfa meal	5.0
Cottonseed meal	3.4
Urea	0.5
Salt	0.4
Dicalcium phosphate	0.4
Calcium carbonate	0.4
Total	100.0
Aurofac-50, mg/lb	123
Vitamin A supplement, mg/lb (30,000 IU/gm)	50

[1] Dry matter basis.

Table 2. Proximate Analysis

Grain	Dry Matter	Crude Protein[1,2]	Ash[1]	Ether Extract[1]	CHO[1,3]
(Trial 1)	%	%	%	%	%
DRW	89.44	14.32	2.01	1.77	81.90
MW	92.81	14.79	1.81	1.71	81.69
(Trial 2)					
DRW	89.57	14.67	2.38	1.12	81.83
MW	94.73	14.02	1.91	1.19	82.88

[1] Values expressed on 100% dry matter basis.
[2] 6.25 X percent nitrogen.
[3] 100 — (Sum of crude protein, ash and ether extract).

Table 3. Feedlot Performance and Carcass Merit

	Trial 1 (112 days)		Trial 2 (171 days)	
	DRW	MW	DRW	MW
No. steers	15	15	18	17
Initial live shrunk wt, lb.	734	730	490	485
Final live shrunk wt, lb.	1120	1138	1034	1083
Daily feed, lb.[1,5]	20.02	20.64	15.79[3]	17.22[4]
Daily gain, lb.[5]	3.46	3.64	3.20[3]	3.51[4]
Feed/lb. gain, lb.[1]	5.83	5.66	4.95	4.92
Dressing percent	61.22	61.16	61.69	62.29
Conformation[2,5]	11.87	12.07	11.50[3]	12.61[4]
Marbling[3]	11.73	12.53	12.89	13.33
Ribeye area, sq. in.[5]	12.57[1]	11.69[2]	12.23	12.78
Fat thickness, in.	.89	.89	.92	1.01
KHP fat, percent	2.57	2.73	2.50	2.61
Carcass grade	8.73	8.93	9.33	9.33
Cutability, percent[4]	48.37	47.54	48.43	47.97
Abcessed livers	5	4	12	12
Ruminal pH[5]	6.3[1]	6.5[2]	5.7[1]	6.1[2]

[1] Dry matter basis.
[2] U.S.D.A. grade converted to the following numerical designations: 7=low good, 8=average good, 9=high good, 10=low choice.
[3] Marbling scores: 11=slight, 14=small, 17=modest.
[4] Percent boneless trimmed retail cuts=52.66–5.33 (fat thickness)–0.979 (percent kidney fat)+0.665 (ribeye area)–0.008 (chilled carcass wt.).
[5] Values with different superscripts differ significantly within trials:
[1,2]: ($P<.05$).
[3,4]: ($P<.01$).

treatments for any of the feedlot parameters, although average daily gain and feed efficiency tended to be better on MW. Consumption (dry matter basis) was slightly lower on DRW (20.0 *vs.* 20.6). This may be due to the finer, dustier, nature of the DRW grain. In trial 1, ribeye area was significantly less ($P<.05$) on MW.

In trial 2, average daily intake was significantly greater ($P<.01$) on MW (15.8 *vs.* 17.2 lb). Also, average daily gain was significantly greater

($P<.01$) on the MW treatment (3.20 *vs.* 3.51 lb). Feed efficiency tended to be better for MW treatment, reflecting the greater feed intakes. Steers on DRW had a lower carcass conformation score ($P<.01$), but none of the other carcass characteristics were significantly different ($P>.05$) between treatments.

In both trials, the number of abcessed livers, although high, were similar between treatments. Rumen pH values in both trials were significantly higher ($P<.05$) on the MW.

High Moisture Barley for Beef Cattle

Jerry Aimone and Donald G. Wagner

Story in Brief

Two high moisture barley processing techniques were compared with dry rolled barley in two cattle feeding trials. In the first trial, two treatments were evaluated: 1) dry rolled barley (DRB) and 2) reconstituted barley (RB). The treatments studied in the second trial were: 1) dry rolled barley (DRB), 2) reconstituted barley (RB) and 3) high moisture harvested (HMH). Forty-eight steers averaging 675 lb. were fed for 110 days in trial 1. Trial 2 involved 36 steers averaging 623 lb. fed for 88 days.

In both trials average daily intakes were lower on the DRB treatments, with intake being significantly lower ($P<.01$) on DRB in trial 2. In trial 2, DRB, RB and HMH daily intakes were: 17.9, 20.6 and 20.2 lb. In both trials, steers on DRB gained slower than those on the high moisture treatments (trial 1, 3.16 *vs.* 3.24 lb.; trial 2, 2.92, 3.23 and 3.24 lb.). The feed required/lb. of gain in trial 1 was 5.64 lb. on DRB and 5.62 lb. on RB. In trial 2, the lb. feed required per lb. of gain were: 6.14, 6.40 and 6.22 on DRB, RB and HMH, respectively.

Introduction

With the current cost-price squeeze in feeding cereal grains to feedlot cattle, any benefit which can be derived in utilization is highly advantageous to the cattle feeder.