Micronized Sorghum For Finishing Beef Cattle

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Story in Brief

Three densities of Micronized Sorghum, (32, 25 and 18 lb./bu.), were compared with dry rolled sorghum (DRS) in high concentrate rations for finishing cattle. Forty eight steers averaging 570 lb were fed an average of 197 days. The three densities of MS are denoted as MS-32, MS-25 and MS-18.

Average daily feed intakes (D.M. basis) were: 19.0, 18.2, 16.3 and 17.8 lb; average daily gains: 2.51, 2.77, 2.66 and 2.73 lb; and feed efficiency (D.M. /lb gain) : 7.59, 6.53, 6.14 and 6.49 lb on the DRS, MS-32, MS-25 and MS-18 treatments, respectively.

In brief this study suggests that micronization can improve the feed efficiency obtained from sorghum.

Introduction

Grains are added to the rations of finishing cattle to increase digestible energy intake. Modern day finishing rations may contain as much as 80 percent grain. The grain may supply up to 90 percent of the usable energy of the ration. Any improvement in the efficiency of utilization of the grain will be reflected in reduced feed requirement and possibly improved gain. Processing imparts certain physical and chemical changes which increase nutrient digestibility. Until recent years, dry heat processing of sorghum grain has not been widely used.

Recent research at OSU indicates that micronized sorghum grain results in improved sorghum utilization by feedlot cattle. With todays rising grain cost a slight reduction in the feed requirement per unit of gain is associated with a large savings in grain cost. The purpose of this study was to investigate the effect of varying degrees of micronization

(product densities) on the efficiency of sorghum utilization by feedlot cattle.

Materials and Methods

Forty eight crossbred steers [16 Charolais - X, 16 Hereford X (Angus X Holstein) and 16 Hereford X Angus] averaging 570 pounds were selected to compare micronized sorghum (MS) of three densities- (32, 25 and 18 lb/bushel) with dry rolled sorghum (DRS). The steers were gradually adapted to a 90 percent concentrate ration during a three week preliminary period. After the preliminary period, the steers were randomly assigned to four treatments with four animals per pen and 3 pens per treatment. There was an equal number of animals of each breed on each treatment to remove the effect of breed. The treatments compared were as follows:

1) Dry rolleg sorghum (DRS)
2) Micronized sorghum, 32 lb/bushel (MS-32)
3) Micronized sorghum, 25 lb/bushel (MS-25)
4) Micronized sorghum, 18 lb/bushel (MS-18)

The steers were fed daily in quantities which permitted availability of feed until the next feeding.

The equipment used for micronizing the milo was a reciprocating steel table. The table was ½ inch thick, 46½ inches wide and 13 feet long and activated by a ½ horsepower electric motor. Eight gas-fired infrared generators, rated at 50,000 BTU per hour and suspended approximately 6 inches above the table were used to heat the sorghum as it passed over the table. Before being metered onto the table, the sorghum was cleaned by using a Clipper cleaner, model 27, to assure an even flow free of foreign materials for efficient operation of the machine. The milo after being passed under the gas-fired generators then dropped directly through a 8½ X 30 inch roller mill with a roller spacing of .003 inch. The three levels of micronized milo were prepared by varying the time of exposure and the intensity of heat from the infrared heaters. The DRS was cleaned in the same manner and rolled through the same roller mill as the MS.

The composition of the experimental rations are given in Table 1. The rations were formulated to contain the composition indicated on a dry matter basis. Synovex S was implanted at the beginning of the trial. At two separate times during the feeding period, rumen samples were collected from each animal. The rumen fluid pH values were determined immediately, and a small amount was saved for VFA analyses.

Initial weights were taken full with a 4 percent pencil shrink, and final weights were taken after a 16 hour shrink off feed and water. The

feeding period lasted 179 days for the Angus X Hereford steers and 214 days for the remainder of the steers. At the end of the trial, specific gravities were determined on each carcass to determine net energy values of the feed using the comparative slaughter technique.

Results and Discussion

The proximate analysis data are presented in Table 2. The feedlot performance data are shown in Table 3. The average daily feed intakes (D.M. basis) on the DRS was 19.0 lb compared to 18.2, 16.3 and 17.8 lb on the MS-32, MS-25 and MS-18, respectively. These differences were not significant ($P>.05$) although the MS treatments tended to be lower. Average daily gains were 2.51, 2.77, 2.66 and 2.73 lb on the DRS, MS-32, MS-25 and MS-18 treatments, respectively. The feed required per pound of gain was 7.59 lb on the DRS compared to 6.53, 6.14 and 6.49 on the MS-32, MS-25 and MS-18, respectively. As noted feed efficiency favored the three MS treatments over the DRS, with little or no difference noted among the three degrees of micronization. These results suggest that micronizing sorghum tended to reduce feed intakes, but produced similar gains resulting in an improved feed/grain ratio. The increased efficiency of utilization is probably due to increased starch digestion.

Net energy values for the grain are given in Table 4. The net energy values tended to lower on the DRS treatment compared to the MS treatments, agreeing with observations noted on feed efficiency.

No significant differences were noted in the carcass traits (Table 5).

Table 1. Ration Composition[1]

Ingredient	Percent
Milo	80.0
Cottonseed hulls	5.0
Alfalfa meal (pelleted)	5.0
Molasses	4.0
Soybean meal	4.0
Urea	0.7
Salt, T.M.	0.5
Dicalcium Phosphate	0.4
Calcium carbonate	0.4
Aurofac-50	225 g
Vitamin A (30,000 IU/g)	200 g

[1] D.M. basis.

Table 2. Proximate Analysis of Milo

	Dry Matter	Crude Protein[1,2]	Ash[1]	Ether Extract[1]	CHO[1,3]
DRS	86.9	10.04	1.29	2.78	85.89
MM-32	89.8	10.17	0.97	2.49	86.37
MM-25	91.4	10.39	0.86	2.49	86.26
MM-18	92.8	9.83	0.99	1.81	87.37

[1] D.M. basis.
[2] 6.25 X percent nitrogen.
[3] 100 – (Sum of figures for crude protein, ash and ether extract).

Table 3. Feedlot Performance

	DRS	MS-32	MS-25	MS-18
No. of animals	12	12	12	12
Initial weight, lb.	565	570	574	572
Final weight, lb.	1054	1109	1091	1113
Daily feed, lb.	19.0	18.2	16.3	17.8
Daily gain, lb.	2.51	2.77	2.66	2.73
Feed/lb. gain, lb.[1]	7.59	6.53	6.14	6.49

[1] D.M. basis.

Table 4. Net Energy Value

	DRS	MS-32	MS-25	MS-18
	Mcal/cwt			
NE_{m+g} of total ration	57.3	65.9	70.5	65.0
NE_{m+g} of grain	60.9	71.4	76.8	69.1
NE_m of grain	62.3	86.8	96.4	78.6
NE_g of grain	41.4	57.7	64.1	52.3

Table 5. Slaughter and Carcass Information

	DRS	MS-32	MS-25	MS-18
Dressing, %[1]	62.7	62.1	61.3	63.2
Carcass grade[2]	9.4	10.0	9.5	10.0
Ribeye area, sq. in	12.83	12.42	12.59	13.30
Fat thickness, in[3]	0.71	0.87	0.67	0.79
Cutability, %	49.8	44.5	49.7	48.8

[1] Calculated on basis of live shrunk weight and chilled carcass weight.
[2] U.S.D.A. carcass grade converted to following numerical designations: high prime–15, average–14, low prime–13, high choice–12, average choice–11, low choice–10, high good–9, average good–8, low good–7.
[3] Average of three measurements determined on tracing at the 12th rib.