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Aspirated oat liftings for growing calves

Abstract

Feed value of aspirated oat liftings (AOL), a by-product of the oat milling industry, was evaluated by using it to replace 33, 67, or 100% of 36 lb/bu oats in a growing diet fed to heifers. Ammonia treatment of AOL was also tested. Dry matter intake and feed/gain increased linearly (P<.10) with increased AOL. Daily gains were similar for 33, 67, and 100% AOL inclusions, which were lower (P<.01) than the control (0% AOL). Despite lower performance, cheaper costs of production may be achieved with AOL depending on its price relative to other feedstuffs. Ammonia treatment of AOL had no beneficial effect on heifer performance in this study.

Keywords

Cattlemen's Day, 1990; Kansas Agricultural Experiment Station contribution; no. 90-361-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 592; Beef; Oats; By-products; Ammoniation; Growing

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ASPIRATED OAT LIFTINGS FOR GROWING CALVES

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Summary

Feed value of aspirated oat liftings (AOL), a by-product of the oat milling industry, was evaluated by using it to replace 33, 67, or 100% of 36 lb/bu oats in a growing diet fed to heifers. Ammonia treatment of AOL was also tested. Dry matter intake and feed/gain increased linearly ($P<.10$) with increased AOL. Daily gains were similar for 33, 67, and 100% AOL inclusions, which were lower ($P<.01$) than the control (0% AOL). Despite lower performance, cheaper costs of production may be achieved with AOL depending on its price relative to other feedstuffs. Ammonia treatment of AOL had no beneficial effect on heifer performance in this study.

(Key Words: Oats, By-products, Ammoniation, Growing.)

Introduction

Cow-calf producers and backgrounders must continually evaluate locally available feed by-products to reduce production costs and maintain profitability. Aspirated oat liftings (AOL), a by-product of the oat milling industry sometimes referred to as "bulk jeminas," offers potential as a dietary energy source for cattlemen in proximity to oat milling plants. Relative to normal oats, AOL contains more fiber and ash and less energy, which reflect the high content of lightweight grain, chaff, and other debris. Although AOL generally can be obtained at a considerable cost savings, the feeding value of this material has not been evaluated. Further, because of the relatively high fiber content, it was of interest to see if oat liftings would respond to ammonia (NH_3) treatment. Therefore, we conducted a study to evaluate the feeding value of non-treated or NH_3-treated AOL in growing diets for cattle.

Experimental Procedures

Aspirated oat liftings were trucked to Manhattan from an oat milling facility in St. Joseph, Missouri, split into two lots, and stored in Ag-Bags®. One bag was treated with anhydrous NH_3 (3% of weight) and was allowed to react for one month before feeding.

Eighty heifer calves with an average starting weight of 680 lb were blocked by weight to 10 pens (8 heifers per pen, two pens per treatment). Untreated AOL replaced 33, 67, or 100% of 36 lb/bu oats in the test diets (Table 10.1); control diet was 100% oats. To test the

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[1]Southeast Area Extension Office, Chanute.

Table 10.1. Composition of Diets[a]

	Ratio of oats to oat liftings				
Ingredient	100: 0	67: 33	33: 67	0: 100	0: 100 (NH_3)
Sorghum silage	30	30	30	30	30
Oats (36 lb)	57	38	19		
Aspirated oat liftings		19	38	57	
NH_3-treated liftings					57
Supplement	13	13	13	13	13
Ration cost, \$/ton[b]	58.36	52.06	45.98	40.12	40.90

[a]Dry basis. Diets formulated to contain 12% CP, .5% Ca, .3% P and .8% K.
[b]Using prices of \$5.50, \$2.50 and \$3.25 per cwt for oats, aspirated oat liftings and NH_3-treated aspirated oat liftings, respectively.

ammoniated product, a fifth diet was formulated in which all the grain was ammonia-treated AOL. Daily gain, dry matter intake, and feed efficiency were measured over a 60-d period.

Results and Discussion

Aspirated oat liftings contained less protein and more fiber and ash than the control oats used in this study (Table 10.2). Ammonia treatment of AOL increased crude protein and reduced NDF contents by 8.1 and 8.2 percentage units, respectively, suggesting that effective ammonia treatment had been accomplished. Bulk density of AOL used in this study averaged about 24 lb/bu, or 65% of the density of the 36 lb control oats.

Table 10.2. Chemical[a] **and Physical Parameters for Oats and Aspirated Oat Liftings**

		Aspirated oat liftings	
Item	Oats	Nontreated	3% NH_3
Crude protein, %	12.9	11.1	19.2
NDF, %	43.0	53.1	44.9
ADF, %	27.1	30.8	29.3
TDN, %[b]	69.0	66.6	67.5
Ash, %	4.0	5.1	5.2
Bulk density, lb/bu	36.8	23.5	24.0

[a]Dry matter basis.
[b]Estimated from ADF content.

Table 10.3. Performance of Heifers Fed Oats or Aspirated Oat Liftings

Item	Ratio of oats to oat liftings				
	100: 0	67: 33	33: 67	0: 100	0: 100 (NH_3)
Initial wt, lb	680	680	680	680	681
Daily feed, lb DM[a]	18.1	18.9	19.7	20.7	20.4
Daily gain, lb[b]	2.87	2.57	2.63	2.55	2.41
Feed/gain[a]	6.31	7.41	7.49	8.13	8.46
Feed costs, $					
per head	48.75	45.44	41.81	38.33	38.88
per lb gain	.283	.295	.265	.251	.265

[a]Linear effect of aspirated oat liftings level ($P \leq .10$).
[b]Control vs AOL (trt 1 vs trt 2,3,4; $P < .01$).

Dry matter intake increased linearly ($P \leq .10$) with increased AOL in the diet (Table 10.3). Feeding AOL may exert a laxative effect, similar to other fibrous by-product feeds (rice bran, cottonseed hulls, soybean hulls). Alternatively, AOL may have diluted dietary energy concentration, resulting in increased intake. Daily gains were 8 to 11% greater ($P < .01$) for heifers fed oats vs untreated AOL. Level of AOL (from 33 to 100% replacement) did not affect daily gain. Gains were lowest with the NH_3-treated AOL diet. Efficiency of feed conversion decreased linearly ($P < .06$) with increased AOL, but total feed costs per head and per unit of gain decreased for the 67 and 100% AOL diets, because of the large price difference between oats and oat liftings. Using feed conversion as an index, AOL was 28 to 30% lower in feed value than oat grain. This substantial difference in feed value is at odds with the small 2.4 percentage unit difference in calculated TDN of oats vs AOL, based on ADF content (Table 10.1), and illustrates the shortcoming of using fiber content alone to estimate the energy value of certain by-product feeds.

Within the constraints of this experiment, it appears that oat liftings can be used successfully at up to 60% of the ration dry matter in growing diets. Although not tested in this experiment, higher levels of inclusion may result in inordinately high feed consumption, poorer efficiency, and higher costs of production. Further, the low bulk density of this and other milling by-products increases freight cost per unit, negating price advantages if shipping distance is great. Ammoniation of AOL produced no performance benefit and was not cost effective in this study.