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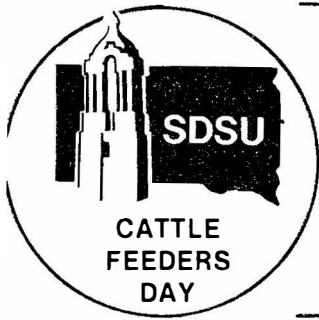
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OAT GRAIN RATIONS FOR GROWING AND FINISHING CATTLE

R. W. Rosenboom, L. B. Embry and R. M. Luther
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Summary

Feeding and digestion trials were conducted to determine performance of growing and finishing steers fed oats as the only grain in rations without added roughage. Oat grain was fed whole, rolled or ground and pelleted.

Similar weight gain was obtained when animals were fed whole and rolled grain. Steers fed rolled oats consumed less feed (1.1 lb. average daily). This lower feed consumption with about the same rate of gain resulted in lower feed requirements (5.1%) in comparison to whole oats.

Steers fed ground and pelleted oats gained at a faster rate (10.8%) than controls. They also consumed slightly less daily feed (.6 lb.) and had lower feed requirements (12.9%).

The digestion trial showed an improvement of 4.9% in digestibility of protein and organic matter for rolled oats over whole oats. Digestibility of rolled or ground and pelleted oats was similar.

Major problems with feeding oats without added roughage to cattle appear to be inadequate feed intake for high levels of production and those associated with digestive disorders. Whole oats appeared to present less of these problems than rolled or ground and pelleted oats. Comparisons were not made with other grains. However, gain was less and feed requirements were higher than typical for high-concentrate rations with corn grain.

Introduction

Oats are the world's fourth largest grain crop and South Dakota ranks first in oats production in the United States. Traditionally, oats have been used in limited amounts in rations for starting cattle on feed, wintering breeding flocks and herds, creep feeds and growing and backgrounding operations. The availability may make the grain a feasible alternative as a major feed grain if economic conditions are favorable.

Less supplemental protein is needed for cattle when feeding oats due to the higher protein content. The energy value is substantially lower than for corn grain primarily due to the high percentage of hulls. Light weight oats contain more hulls and, therefore, more fiber. This is why variation in the test weight may play a major role in feeding value. Oat grain has approximately the same fiber and energy contents as a ration with 60% shelled corn and 40% alfalfa hay. It is thus evident that oats must replace roughage as well as other grain in the ration or production will be reduced.

Processing methods such as rolling, grinding or pelleting are attempts to improve animal performance and utilization of a feedstuff. Reduction in particle size has been shown to affect rate of passage through the digestive tract and may improve digestibility. However, excessively fine grinding can result in digestive upsets that may decrease animal performance. Processing roughages has often been shown to improve gains and feed efficiency. Processing concentrates more often has resulted in improved efficiency only.

The poor animal performance obtained with rations containing a high amount of oats indicated a need to more accurately describe the place of oats in growing and finishing rations for cattle. Therefore, this experiment was conducted to study whole, rolled or ground and pelleted oats as the only grain for feedlot steers. Feedlot performance and digestibility were determined and compared for each form of oats.

Procedure

Feeding Trial

Ninety-six Hereford, Hereford-Angus and Limousin cross steers were used in a growing-finishing experiment. They were allotted into 12 pens of eight steers each on basis of weight and breed group (four Herefords, two Hereford-Angus and two Limousin crossbreds per pen).

Processing treatments for the animals included ear tagging, injecting with Clostridium chauvoei-septicum-novyii-sordelli bacterin, Warbex pour-on and a Tramisol injection.

Experimental treatments were oat grain fed whole, rolled to a fineness to essentially eliminate any whole kernels or finely ground and pelleted (3/16 inch). Oat grain was full fed with 2 lb. of a corn-base supplement which furnished minerals and vitamin A and monensin. The steers were adapted to the oat rations over a period of 10 days by gradual reduction in alfalfa-brome haylage and increases in oat grain. The cattle had been full fed the haylage without grain for about 6 weeks prior to the experiment. After increasing to a full feed, feeding was in amounts to be available at all times and offered once daily.

After several weeks on the experiment, implant treatments of zeranol and Synovex were superimposed upon replications of dietary treatments for the experiment. Results showed no response to implants under conditions of the experiment. Results, therefore, have been presented for oat grain treatments averaged for implant treatments.

Digestion Trial

Two digestion trials were conducted with the rations fed in the feeding trial. Collection periods were 5 days for each trial after suitable preliminary and adjustment periods for the experimental diets and conditions of the digestion trials.

Twelve steers weighing about 600 lb. were selected for each digestion trial with Angus used for one and Herefords for the other. Two steers could not be managed in the metabolism crates and one was not used because of poor feed consumption. Data for the two digestion trials were combined with 7, 6 and 8 steers fed whole, rolled and pelleted oat rations, respectively.

Results

Feeding Trial

Results of the feeding trial are shown in table 1. The experiment was terminated after 180 days. Feed consumption and weight gain at this time were considered unsatisfactory for the use of oat grain in all-concentrate finishing rations for cattle. Weight gain became progressively less with increasing weight, finish and time on experiment. Additional time on the experiment did not appear needed to evaluate effects of the processing methods on animal performance and feed utilization. The cattle were not marketed for carcass data because of inadequate weights and finish at this time.

Steers fed the ration with whole oats gained 1.85 lb. daily. The oats were high quality with a test weight of 39.1 lb. per bushel. Rolling the oats and reducing the density per bushel had essentially no effect on weight gain of the steers. Rolling the oats appeared to reduce feed consumption. Steers fed rolled oats consumed an average of 1.1 lb. less feed daily than those fed the whole oat ration. The lower feed consumption with about the same rate of gain gave lower feed requirements in comparison to whole oats (5.1%).

Table 1. Whole, Rolled or Ground and Pelleted Oats Fed Steers
Feedlot Performance
June 7 to December 4, 1979--180 Days

Item	Whole	Rolled	Ground and pelleted
Density of oats as fed to cattle, lb./bushel	39.1	26.4	45.6
Number of steers ^a	31	32	30
Avg. initial wt., lb.	640	636	634
Avg. final wt., lb.	968	964	1003
Avg. daily gain, lb.	1.85 ^{bc}	1.83 ^b	2.05 ^c
Avg. daily feed (dry), lb.	16.9	15.8	16.3
Feed/gain	9.15 ^b	8.68 ^{bc}	7.97 ^c

^a Initially 32 steers per treatment group. The loss in the control was undiagnosed but not believed related to ration. The two in the pelleted group were from acidosis.

^{b,c} Means in the same row with different superscripts are statistically different (P<.05).

Steers fed the ground and pelleted oats gained 2.05 lb. daily. This improvement over the whole oat group amounted to 10.8%. Feed intake was at a lower rate than for whole oats (.6 lb. daily). The higher gain with slightly less feed gave a feed requirement of 12.9% less than for whole oats.

The ground oats did not make a good firm pellet. Considerable crumbling occurred and it was estimated that about one-half of the oats offered was in a meal form.

Digestion Trial

Results for the two digestion trials are shown in table 2. Feed consumption was less under the conditions of the digestion trials than for the feeding trial. This is commonly observed because of the restraining of animals necessary. However, the average weight of the steers during the feeding trial was greater. As a percentage of average body weight, feed intake during the digestion trial was only slightly reduced.

Table 2. Apparent Digestibilities of Various Forms of Oats by Feedlot Steers (Composite of Two 5-Day Trials)

Item	Whole	Rolled	Ground and pelleted
DM consumed/steer/day, lb.	12.0	10.4	10.7
Digestion coefficients, %			
Dry matter	69.11	72.53 _{ab}	70.77 _b
Crude protein	76.79 ^a	80.59 ^{ab}	80.97 ^b
Organic matter	70.38	73.84	72.33

^{a,b} Means in the same row with different superscripts are statistically different (P<.05).

Digestion coefficients were slightly higher for rolled and ground and pelleted oats than when fed whole. Values shown represent 4.9% greater digestion both for protein and organic matter for rolled oats over whole oats. There were smaller differences between ground and pelleted and the rolled oats.