

# **Comparison of Cottonseed Hulls and Wheat Straw as a Roughage Ingredient in Steer Finishing Rations**

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### **Story in Brief**

Data were analyzed from 87 choice Angus steers involved in a 196 day feedlot trial involving two rations that differed only with regard to a roughage ingredient. One ratio contained 15 percent cottonseed hulls and the other contained 15 percent wheat straw. The feedlot performance and carcass data were essentially the same for both rations which suggests that wheat straw can be successfully utilized in a finishing ration and should be considered when it is economically advantageous to do so.

### **Introduction**

Cattle finishing rations commonly contain some roughage ingredient which can, in some circumstances, be an expensive feed item. Many Oklahoma farms have available sources of roughage. The use of these roughages in cattle finishing rations could result in some economic advantage providing they are as effective in the ration as the conventional roughages purchased from sources off the farm. The purpose of this study was to evaluate a readily available roughage on many Oklahoma farms, wheat straw, as a roughage replacement for a commonly purchased roughage for finishing rations, cottonseed hulls.

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In cooperation with Ft. Reno Livestock Research Station, Agriculture Research Service, Animal Science Research Division, USDA.

## Materials and Methods

A 196-day feeding trial was conducted to compare wheat straw and cottonseed hulls as roughage ingredients of finishing rations. The 94 choice Angus steers initially allotted to this experiment were the progeny of 10 sires involved in a progeny testing program as a part of the beef cattle breeding project. In order to maintain valid progeny test comparisons between sires, half of each sire group was allotted to each treatment group. Within this restriction, the steers were allotted to each treatment group such that their actual weaning weights were equalized (440 lbs. for both groups). The steers were weaned at an average of 205 days at the Lake Carl Blackwell range and were transported to the Ft. Reno Livestock Research Station where they were placed on feed test two weeks after weaning. The steers were fed in two adjoining pens that opened to the south from a feeding barn. An outbreak of respiratory disease was experienced with these steers and data from those animals that became extremely sick in addition to those that died were excluded from the analysis (4 from the cottonseed hull ration and 3 from the wheat straw ration).

The composition of the rations is presented in Table 1. These rations have a higher roughage content than most conventional finishing rations simply because the cottonseed hull ration was formulated for use in measuring postweaning feedlot performance for bulls raised in the beef cattle selection study being conducted at Ft. Reno. The only difference in

Table 1. Composition of Rations.<sup>1</sup>

Ingredient	Amount in Percent	
	Cottonseed Hull Ration	Wheat Straw Ration
Shelled corn	32.5	32.5
Oats	20.0	20.0
Cottonseed hulls	15.0	0
Wheat straw	0	15.0
Alfalfa	15.0	15.0
Soybean meal (44%)	12.5	12.5
Molasses	5.0	5.0
<i>Chemical Analysis (%)</i> <sup>2</sup>		
Dry matter	89.5	89.6
Crude protein	13.5	13.7
Acid detergent fiber	20.2**	17.2**
Ether extract	2.7	2.9

<sup>1</sup> In addition both rations had 10 lbs. of salt and 5 lbs. of aurofac-10 added per ton and mineral salt and bone meal was provided *ad lib.*

<sup>2</sup> Average determination from 17 samples obtained of each ration over the feeding period. Chemical composition presented on an as is basis.

\* Treatment means different at the 0.01 probability level.

the formulation of these two rations was the replacement of cottonseed hulls by wheat straw. The rations were ground through a  $\frac{3}{8}$  inch screen and fed to the steers in self feeders. The only difference in the chemical composition detected in the two rations was the 3 percent higher ( $P < 0.01$ ) acid detergent fiber content of the cottonseed hull ration.

## Results and Discussion

The feedlot performance and carcass data of the steers in the cottonseed hull and wheat straw rations are presented in Table 2. The initial weights were determined at the start of the feeding trial two weeks after the steers were weaned. They differ slightly for the two treatments because the initial allotment to treatment groups was based on weaning weights along with the fact that data on 7 steers were eliminated from the analysis because of sickness or death.

The most striking result of this study was that all of the feedlot performance and carcass traits measured were clearly not significantly different between the two treatments. It should be emphasized that the number of animals involved and the design of this study were such that relatively small differences in performance could have been detected had they existed.

No particular difficulties were encountered from using wheat straw in the ration. There appeared to be a slight tendency for the steers on

Table 2. Feedlot Performance and Carcass Information (196 days).<sup>1</sup>

Trait Measured	Cottonseed hull ration	Wheat straw ration
No. steers	43	44
<i>Feedlot data:</i>		
Initial weight, lbs.	432	428
Final weight, lbs.	846	834
Daily gain, lbs.	2.11	2.07
Feed/lb. gain, lbs.	8.21	7.91
<i>Carcass data:</i>		
Hot carcass weight, lbs.	542	531
Dressing percent	64.1	63.7
Carcass grade <sup>2</sup>	10.4	10.4
Ribeye area, sq. in.	10.4	10.2
Fat thickness, in.	0.81	0.79
Marbling score <sup>3</sup>	5.1	5.3
Cutability, % <sup>4</sup>	49.2	49.3

<sup>1</sup> None of the differences in performance from these rations were significant ( $P < 0.05$ ).

<sup>2</sup> U.S.D.A. carcass grades converted to the following numerical designations: high choice-12, avg. choice-11, low choice-10, high good-9.

<sup>3</sup> Marbling score equivalents: moderate-7, modest-6, small-5, slight-4.

<sup>4</sup> Estimated percentage boneless retail cuts from round, loin, rib and chuck.

wheat straw to look fuller; however, an increase in incidence of bloat was not observed.

Results from this study suggest that wheat straw can be successfully utilized as a roughage in finishing rations and should be considered when available at a price below that of cottonseed hulls or other similar roughages.

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# A Comparison of Corn Processing Methods, Several Levels of Corn Silage, and Sorghum Stover Silage versus Corn Silage for Finishing Steers

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## Story In Brief

Three methods of processing corn were compared. High-moisture-harvested ground corn and ground-reconstituted corn were utilized 11.0 and 6.5 percent more efficiently than dry ground corn.

A ration containing 20 percent corn silage did not produce faster gains but was utilized 14.5 percent more efficiently than a ration containing 20 percent sorghum stover silage.

Rations containing 20 and 50 percent corn silage were similar in terms of cost of gain and carcass grade, but the 20 percent silage ration had an advantage in rate and efficiency of gain. An 80 percent silage ration produced economical gains, but carcass grades indicated a longer feeding period would have been desirable.

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