

2001

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T.B. Farran

R.D. Hunter

Sean P. Montgomery

J.J. Sindt

See next page for additional authors

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Recommended Citation

Farran, T.B.; Hunter, R.D.; Montgomery, Sean P.; Sindt, J.J.; Blasi, Dale A.; and Drouillard, James S. (2001) "Using a mixture of cottonseed hulls and cottonseed meal to replace alfalfa hay in diets for stressed feeder calves," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 1. <https://doi.org/10.4148/2378-5977.1762>

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Using a mixture of cottonseed hulls and cottonseed meal to replace alfalfa hay in diets for stressed feeder calves

Abstract

One 28-day receiving experiment was conducted using 625 exotic x British cross heifers to evaluate growth performance and morbidity on receiving diets that contained either alfalfa hay or a pellet composed of 65% cottonseed hulls and 35% cottonseed meal as the roughage source. Heifers fed the cotton byproduct pellet consumed more feed ($P < 0.01$) but tended to be less efficient than those fed alfalfa hay. Daily gain was comparable between diets ($P > 0.05$), and the percentages of heifers diagnosed, treated, or retreated for respiratory disease were similar.

Keywords

Cattlemen's Day, 2001; Kansas Agricultural Experiment Station contribution; no. 01-318-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 873; Beef; Cottonseed hulls; Receiving cattle; Health

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Authors

T.B. Farran, R.D. Hunter, Sean P. Montgomery, J.J. Sindt, Dale A. Blasi, and James S. Drouillard

USING A MIXTURE OF COTTONSEED HULLS AND COTTONSEED MEAL TO REPLACE ALFALFA HAY IN DIETS FOR STRESSED FEEDER CALVES¹

D. A. Blasi, J. S. Drouillard, T. B. Farran,
R. D. Hunter, S. P. Montgomery, J. J. Sindt

Summary

One 28-day receiving experiment was conducted using 625 exotic × British cross heifers to evaluate growth performance and morbidity on receiving diets that contained either alfalfa hay or a pellet composed of 65% cottonseed hulls and 35% cottonseed meal as the roughage source. Heifers fed the cotton byproduct pellet consumed more feed ($P < 0.01$) but tended to be less efficient than those fed alfalfa hay. Daily gain was comparable between diets ($P > 0.05$), and the percentages of heifers diagnosed, treated, or retreated for respiratory disease were similar.

(Key Words: Cottonseed Hulls, Receiving Cattle, Health.)

Introduction

Typically, feed intake of stressed feeder calves is low and extremely variable following transportation and introduction into a receiving facility. Adequate energy intake is critical for mounting an effective immune response. Consequently, rations that are fed during the receiving period must be palatable and fortified with high levels of crude protein, energy, minerals, and vitamins. Furthermore, a roughage source that is palatable and promotes ruminal health is critical throughout the transition to a feedlot diet. Our objective was to compare the growth performance and morbidity/mortality rates of stressed calves fed receiving diets containing alfalfa hay or a mixture of cottonseed hulls and cottonseed meal.

Experimental Procedures

Six hundred twenty five crossbred heifers averaging 448 lb were fed receiving diets containing either alfalfa hay or a mixture of cottonseed hulls and cottonseed meal. Calves were purchased from sale barns in Kentucky and Tennessee and transported to the KSU Beef Cattle Research Center in Manhattan. They were placed into a large pen on arrival, given free access to long-stem prairie hay and water, and processed within 24 hours of arrival. Weight and rectal temperature were recorded, and heifers were given Cydectin[®] pour-on, Fortress-7[®], a Ralgro[®] implant and a metaphylactic dose of Micotil[®] at 1.5 ml per 100 lb body weight. They were allotted randomly to their respective treatments and placed into one of 12 pens of 48 to 55 head each. A second dose of Fortress-7 was given 12 to 14 days after initial processing.

Diets are shown in Table 1. Heifers were fed their respective diets once daily, *ad libitum*. After the 28-day receiving trial all heifers were fed a common diet to equalize ruminal fill between treatments. Feed consumption and weight gain were monitored throughout the receiving period.

Animals that exhibited clinical signs of respiratory disease were identified each morning and were treated for respiratory disease if clinical signs were accompanied by a rectal temperature $\geq 103^{\circ}\text{F}$, or if they exhibited clinical signs on 2 consecutive days. The initial respiratory disease treatment was a subcutaneous injection of Micotil at 1.5 ml

¹Sincere appreciation is expressed to the National Cottonseed Products Association for financial support.

per 100 lb body weight. Heifers were returned to their original pen following treatment. When necessary, calves were retreated after 48 hours, regardless of rectal temperature. The third-time treatment was a combination of 6 ml/100 lb body weight LA[®] 200 and 5 ml/100 lb body weight Tylan[®] 200, administered intramuscularly.

Results and Discussion

Table 2 summarizes the performance of heifers during the 28-day receiving experiment. Heifers fed the cotton byproduct pellet consumed more feed ($P < 0.01$) but tended to be less efficient than the heifers that were fed alfalfa hay (5.61 vs 4.78 lbs of feed/lb gain). Whether calculated on a dead in or dead out basis, daily gain was comparable between

diets. The percentage of heifers diagnosed and treated, or retreated, for respiratory disease were similar.

Our results indicate that a pelleted cottonseed byproduct (65% cottonseed hulls and 35% cottonseed meal) is comparable to alfalfa hay in receiving diets. The bulk density of cottonseed hulls is low and handling is therefore cumbersome. However, blending hulls with cottonseed meal and pelleting offers distinct advantages in terms of transportation, ease of handling, and protein content. When taken together, these factors improve the marketing radius of these byproducts. Therefore, use of cottonseed byproducts may be a viable alternative to alfalfa in receiving diets.

Table 1. Composition of Receiving Diets (100% Dry Basis)

Ingredient, %	Cottonseed Hulls/	
	Meal Pellet	Alfalfa Hay
Flaked corn	44.65	42.08
Alfalfa hay		40.00
Pelleted cottonseed hulls/meal ^a	40.00	
Cottonseed meal	5.31	8.00
Molasses	6.00	6.00
Vitamin premix	4.04	3.92
Nutrient Analysis		
Dry matter, %	84.7	83.5
Crude protein, %	15.6	15.3
ADF, %	19.4	22.1
Calculated NEg, Mcal/lb	0.51	0.47
Fat, %	3.45	2.46
Phosphorus, %	0.46	0.36
Potassium, %	1.40	1.63
Copper, ppm	10.3	16.8
Zinc, ppm	82.5	89.8
Total starch, %	48.1	41.1

^aContained (dry matter basis) 65% cottonseed hulls and 35% cottonseed meal; nutrient composition: 22.0% crude protein, 34.3% crude fiber, 48.6% ADF, 0.21 Mcal/lb NEg, 0.18% calcium, and 0.64% phosphorus.

Table 2. Performance of Feeder Heifers Fed Receiving Diets Containing Alfalfa Hay or Cottonseed Hulls (65%)/Cottonseed Meal (35%) Pellets as Sources of Roughage

Item	Pelleted Cottonseed Hull/Meal	Alfalfa Hay	P ^a
No. pens	12	12	
No. heifers	313	312	
Daily Gain, lb/day			
Deads in basis	2.15	2.22	0.83
Deads out basis	2.64	2.52	0.72
Dry Matter Intake, lb/day	11.8	10.7	<0.01
Feed:Gain			
Deads in basis	5.61	4.78	0.27
Deads out basis	4.52	4.23	0.54
Mortality	3.2	1.9	0.38
Pulled, %	48.8	45.3	0.44
Treated, %	35.7	35.2	0.89
Retreated, %	26.2	23.2	0.38

^aProbability level that the difference is due to chance.