

# Effect of Extrusion Processed De-Oiled Rice Bran Plus Whole Cottonseed on Growth Performance of Calves

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## Story in Brief

Seventy-two crossbred beef steers were used to evaluate the growth response to supplementing low quality hay with a conventional feed supplement (corn plus cottonseed meal) or de-oiled rice bran plus whole cottonseed, with and without extrusion processing. Supplements were formulated to contain 20% crude protein. Steers fed the corn plus cottonseed meal supplement consumed more hay than calves fed the de-oiled rice bran and whole cottonseed supplements; however, there was no significant difference in body weight or weight gain between treatments throughout the study. Supplementing low quality hay with de-oiled rice bran and whole cottonseed can be a potential alternative to conventional feedstuffs for Arkansas cattle producers. Extrusion processing of the de-oiled rice bran plus whole cottonseed did not affect animal performance, however, extrusion processing, resulting in a pellet, can improve feeding and handling characteristics.

## Introduction

Calves wintered on grass hay generally require supplemental feeds to achieve higher rates of gain. Cotton and rice are two commodities that are produced in Arkansas. Whole cottonseed can be both a good source of supplemental energy and protein. However, its fat concentration (17.5%; NRC, 1996) generally limits the level of inclusion in the diet. De-oiled rice bran is a co-product of the rice milling industry. Extracting the fat from rice bran increases the protein content of the co-product and may also result in improved digestibility of the fiber of the bran. In addition, feed processing such as pelleting, can result in improvements in intake, digestibility, and handling characteristics of feed grains.

The objective of this study was to evaluate the performance of growing beef steers fed hay and a conventional (corn plus cottonseed meal) supplement or supplemented with de-oiled rice bran plus cottonseed with and without extrusion processing.

## Experimental Procedures

Seventy-two crossbred beef steers were blocked by weight (heavy and light) and randomly assigned to one of twelve pens (six head/pen and four pens/treatment) at the feedlot facility of the Southwest Research and Extension Center in Hope, AR. Pens were assigned to one of three dietary treatments consisting of: mixed grass hay (10.9% crude protein, 42.3% ADF, and 71.8% NDF, dry weight basis) and 1) corn plus cottonseed meal (CCSM, positive control), 2) de-oiled rice bran plus whole cottonseed (DRBCS), or 3) extrusion processed de-oiled rice bran plus whole cottonseed (EXT, Compass Feeds, Inc). Supplements were formulated to contain 20% crude protein (DM basis), and were fed at 1% expected mean shrunk body weight for the 63-day study. A complete mineral mix was added to each supplement to provide 1.5 lb per pen, daily.

Shrunk body weights were taken at the beginning of the study and at 21-day intervals until day 63. Hay and supplements were weighed prior to feeding and left-over feed was weighed and dry matter composition determined weekly.

Steer weight and gain data were analyzed as a randomized complete block design using the GLM procedure in SAS (SAS Inst., Inc., Cary, NC). Pen was the experimental unit and block by treatment interaction was used as the error term to test for block and treatment effects. Pen average daily hay dry matter intake was tested for the main effects, block and treatment. When the model was significant ( $P \leq 0.10$ ), treatment contrasts were tested for CCSM versus DRBCS + EXT and DRBCS versus EXT.

## Results and Discussion

Hay dry matter intake was affected by supplemental feed. Pens fed the CCSM supplement consumed 3 lb more hay, daily, than pens fed the DRBCS or EXT diets ( $P = 0.07$ ; 70, 67, and 67 lb hay dry matter, respectively). Hay intake was similar for the DRBCS and EXT supplemented pens.

There were no treatment differences for body weight at the beginning of the study (Table 1). Average daily gain did not differ significantly during any period of the study, and subsequent weights throughout the study were similar for all treatments.

## Implications

Feeding de-oiled rice bran and whole cottonseed instead of conventional supplements with corn and cottonseed meal is an option for Arkansas cattle growers. Extrusion processing did not improve animal performance, but may improve handling characteristics as compared to receiving, blending, and feeding the raw ingredients on the farm.

## Literature Cited

NRC. 1996. Nutrient Requirements of Beef Cattle.

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**Table 1. Hay intake and weight gain of calves supplemented with corn plus cottonseed meal (CCSM), de-oiled rice bran plus whole cottonseed (DRBCS), or extrusion processed de-oiled rice bran plus whole cottonseed (EXT).**

	Treatment			SE	P-value
	CCSM	DRBCS	EXT		
Hay intake (lb DM/pen/day) <sup>a</sup>	70	67	67	1.2	0.18
Steer wt, lb					
Initial, Apr 10	465	474	467	1.7	0.12
May 1	556	562	554	4.8	0.55
May 22	610	606	604	4.8	0.66
Final, June 12	641	640	640	1.9	0.90
Average Daily Gain, lb					
Period I	4.3	4.1	4.1	0.28	0.88
Period II	2.6	2.2	2.4	0.18	0.40
Period III	1.4	1.6	1.7	0.14	0.50
Overall	2.8	2.6	2.7	0.05	0.33

<sup>a</sup> CCSM versus DRBCS and EXT (P = 0.07)