Evaluation of Wet Distillers Byproducts Composite for Finishing Ruminants

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Summary

Two finishing trials evaluated a composite of feed ingredients formulated to be similar in nutrient composition as wet distillers grains plus solubles. Trial 1 used 60 crossbred lambs assigned to one of four treatments: dry rolled corn, dried distillers grains plus solubles, wet corn gluten feed, and wet distillers byproducts composite. Lambs fed the composite diet were more efficient than lambs fed wet corn gluten feed. In Trial 2, 60 yearling steers were fed one of five treatments: dry rolled corn, wet corn gluten feed, wet distillers byproduct composite, wet distillers byproducts composite minus tallow (-FAT), wet distillers byproducts composite minus corn gluten meal (-CGM). Steers fed the composite diet were more efficient than steers fed wet corn gluten feed. A wet distillers byproducts composite can be formulated that improves feed/gain compared with wet corn gluten feed. Additions of corn gluten meal, tallow, and condensed solubles to wet corn gluten feed may help improve the feeding value of wet corn gluten feed and subsequent finishing performance of ruminants.

Introduction

Demand for ethanol and corn sweeteners is on the rise and is predicted to increase in the future. This trend will result in an abundance of byproducts that are potentially economical alternatives to corn. Wet distillers grains and wet corn gluten feed are currently used as sources of protein and energy in feedlot diets. Previous research indicates that wet corn byproducts (distillers grains and thin stillage) are higher in net energy than corn grain; however, wet corn gluten feed (WCGF) is similar in net energy to corn. Potential differences between wet distillers byproducts and WCGF include lipid content, escape protein level, and NDF level. Therefore, two finishing trials evaluated the effect of a composite of feed ingredients formulated to be similar in nutrient composition as wet distillers byproducts.

Procedure

Trial 1

A 60-day finishing trial used 60 crossbred lambs (77 lb) in a randomized complete block design. Lambs were blocked by sex and weight and assigned randomly within block to one of four treatments. Treatments consisted of 1) dry rolled corn, 2) corn dried distillers grains plus solubles (DDGS), 3) wet corn gluten feed (WCGF), and 4) wet distillers byproducts composite (COMP1). The COMP1 was balanced (DM basis) to contain a minimum of 31.6% CP, 16.1% lipid, 16.8% degradable intake protein, and 14.8% undegradable intake protein and consisted of 47.9% WCGF, 11.9% condensed distillers solubles, 30.5% corn gluten meal, and 9.7% tallow (DM basis). All final diets contained 78.9% dry rolled corn or dry rolled corn plus 40% corn byproducts, 10% alfalfa hay,

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6.1% molasses, and 5% dry supplement (DM basis). Diets were formulated (DM basis) to contain a minimum of 12.5% CP, .7% Ca, .35% P, .7% K, and 6.7% degradable protein, and contained 25 g/ton Rumensin. Supplemental protein for the control diet was supplied by urea.

Lambs were adapted to final diets in 21 days using four grain adaptation diets containing 45 (3 days), 35 (4 days), 25 (7 days), and 15% roughage (7 days; DM basis). Lambs were housed individually in a temperature-controlled room and were allowed ad libitum access to feed. Orts were weighed each morning, mixed with the day's diet, and re-fed to the lambs.

Trial 2

A finishing trial using 60 yearling crossbred steers (600 lb) was conducted from July 11 to December 17, 1994. Steers were blocked by previous experimental gain and assigned randomly to one of five treatments. Treatments consisted of a dry rolled corn, WCGF, wet distillers byproducts composite (COMP2), (WCGF, corn gluten meal, tallow), COMP2 minus tallow (-FAT) and COMP2 minus corn gluten meal (-CGM). The tallow and corn gluten meal were replaced with wet corn gluten feed. The COMP2 diet was formulated (DM basis) to contain 12.5% degradable protein, 12.5% undegradable protein, 13.1% lipid, and 32.7% NDF and consisted of 65.8% WCGF, 26.3% CGM, and 7.9% tallow (DM basis). All diets contained (DM basis) 79.1% dry rolled corn or dry rolled corn plus 40% corn byproducts, 5% corn silage, 5% alfalfa, 5.9% molasses based supplement, and 5% dry supplement. Diets were formulated (DM basis) to contain a minimum of 12.0% CP, .7% Ca, .3% P, and .65% K, and contained 25 g/ton Rumensin and 10 g/ton Tylan.

Steers were adapted to the final diets in 21 days using four grain adaptation diets containing 45 (3 days), 35 (4 days), 25 (7 days), and 15% roughage (7 days; DM basis). Roughage was a mixture of alfalfa hay and corn silage with corn silage assigned a roughage value of 50%. Cattle were individually fed once daily using Calan gates and were allowed ad libitum access to feed. Cattle were implanted with Compudose at the onset of the trial and reimplanted with Finaplex-S on day 60. Steers were housed in covered pens with 15 head per pen. Initial weights were based on an average of three consecutive day weights taken before feeding. Hot carcass weight adjusted to 62% dressing percentage was used to calculate final weight. Hot carcass weights and liver abscess scores were recorded at slaughter. Fat thicknesses measured at the 12th rib, quality grades, and yield grades were recorded after a 48-hour chill.

Table 1. Effect of wet distillers byproducts composite (COMP1) on finishing lamb performance

	Treatment[a]			
Item	Control	WCGF	DDGS	COMP1
DM intake, lb/day	2.70	2.85	2.78	2.57
ADG, lb	.62[bc]	.53[b]	.69[c]	.71[c]
Feed/gain[d]	4.35[b]	5.38[c]	4.03[b]	3.62[b]

[a]WCGF = wet corn gluten feed; DDGS = dried distillers grains plus solubles; COMP1 = wet corn gluten feed, condensed distillers solubles, corn gluten meal, and tallow.
[b,c]Means within a row with unlike superscripts differ (P<.10).
[d]Feed/gain was analyzed as gain/feed. Feed/gain is the reciprocal of gain/feed.

Table 2. Effect of wet distillers byproducts composite (COMP2) on finishing steer performance

	Treatment[a]				
Item	DRC	WCGF	COMP2	-FAT	-CGM
DM intake, lb/day	21.55[b]	20.81[bc]	19.52[c]	20.16[bc]	20.94[bc]
ADG, lb	3.09	2.89	2.98	2.92	3.03
Feed/gain[d]	7.09[b]	7.29[c]	6.79[b]	6.89[bc]	6.72[b]
Fat depth, in	.42[b]	.41[b]	.41[b]	.40[b]	.31 [c]

[a]DRC = dry rolled corn; WCGF = wet corn gluten feed; COMP2 = wet corn gluten feed, corn gluten meal, and tallow; -FAT = composite minus tallow; -CGM = composite minus corn gluten meal.
[d]Feed/gain was analyzed as gain/feed. Feed/gain is the reciprocal of gain/feed.
[b,c]Means within a row with unlike superscripts differ (P<.10).

Results

In Trial 1, dry matter intake was not different among treatments (P<.10). However, lambs fed the COMP1 diet gained faster and were more efficient (P<.10) than lambs fed WCGF (Table 1). Although the difference in feed efficiency between the control and COMP2 was not significant, there was a 12% advantage obtained with the COMP1 diet which is similar to previous results with finishing cattle, comparing dry rolled corn and corn wet distillers byproducts. In addition, lambs fed DDGS were intermediate in efficiency between lambs fed dry rolled corn and the COMP1 diet which agrees with previous results with finishing cattle comparing DDGS, corn wet distillers byproducts, and dry rolled corn diets.

In Trial 2, steers consuming the COMP2, -CGM, and dry rolled corn diets were more efficient (P<.10) than the steers fed WCGF (Table 2). No difference in ADG was observed among treatments (P>.10). Steers fed the COMP2 diet consumed less (P<.10) feed than steers fed the dry rolled corn diet with the steers fed WCGF, -FAT, and -CGM being intermediate (P>.10) to these two treatments. Steers consuming -CGM were the leanest among treatments (P<.10). Liver abscess score, quality grade, and yield grade were not different among treatments (P>.10).

A composite of feeds can be formulated that improves efficiency of gain compared with WCGF. However, it is not clear what level of fat, fiber, or escape protein or how the interactions of these ingredients may contribute to the increases in feeding value observed with distillers byproducts. Our results indicate that the lipid fraction of the distillers byproducts may be responsible for the largest increase in efficiency.

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