PERFORMANCE OF BEEF HEIFERS LIMIT-FED GROWING DIETS CONTAINING ALFALFA HAY AND WET CORN GLUTEN FEED

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Summary

Three hundred thirty-nine crossbred beef heifers were used in a 99-day growing study to identify optimum combinations of alfalfa hay and wet corn gluten feed (WCGF) in limit-fed growing diets. Diets contained 10, 20, or 30% ground alfalfa hay, and 0, 40, or 68% *Sweet Bran*® WCGF (dry basis) in a 3 × 3 factorial arrangement of treatments. An interaction occurred ($P<0.05$) between level of alfalfa hay and level of WCGF for both average daily gain and feed efficiency. Increasing the levels of alfalfa hay or WCGF reduced cattle performance, with the exception of the 30% alfalfa hay and 40% WCGF diet, which supported average daily gains similar ($P>0.10$) to diets containing 20 or 30% alfalfa hay and no WCGF. Feed efficiencies for the 30% alfalfa hay and 40% WCGF diet were better ($P<0.05$) than the diet containing 30% alfalfa hay and no WCGF. Dry matter intake as measured two hours after feeding increased linearly ($P<0.01$) with increasing levels of alfalfa hay, and decreased linearly ($P<0.01$) with increasing levels of WCGF. This study suggests that including WCGF at 40% of the diet (dry basis) can effectively replace steam-flaked corn in limit-fed diets containing 20 or 30% alfalfa hay.

(Key Words: Wet Corn Gluten Feed, Alfalfa Hay, Limit Feeding, Growing.)

Introduction

Wet corn gluten feed, a by-product of corn wet milling, consists mainly of corn bran and corn steep liquor. Because of high levels of corn bran, WCGF can supply additional energy for maintenance and growth without the reduction in fiber digestion often seen when substantial quantities of high-starch ingredients (grain) are fed to cattle consuming high-roughage diets. This study was conducted to identify optimum combinations of alfalfa hay and WCGF in limit-fed growing diets containing steam-flaked corn.

Experimental Procedures

Three hundred thirty-nine crossbred beef heifers averaging 609 lb were used in a randomized complete block experiment. To minimize differences in gastrointestinal tract fill, heifers had *ad libitum* access to a common diet for 15 days preceding the growing study. Heifers were then blocked by weight and allotted to pens containing four to seven head per pen, with six pens per treatment. Treatments (Table 1) consisted of diets containing 10, 20, or 30% ground alfalfa hay, and 0, 40, or 68% Sweet Bran WCGF (dry basis) in a 3 × 3 factorial arrangement. All diets provided 30 grams of Rumensin® per ton of dry matter and were fed once daily at 1.6% of body weight (dry basis) for 84 days. On days 8, 22, 37, 51, 64, and 79, unconsumed feed was removed from the feed bunks 2 hours after feeding, immediately weighed, and returned to the bunk in order to measure rate of feed consumption. Prior to obtaining final weights, heifers had *ad libitum* access to a common diet for 15 days.

[1]Cargill Corn Milling, Blair, NE.

Results and Discussion

Performance data are shown in Figures 1 and 2. There was an interaction between alfalfa hay and WCGF level in the diet. Increasing the level of alfalfa hay and WCGF reduced growing performance of heifers, with the exception of the diet containing 30% alfalfa hay and 40% WCGF. Heifers fed that diet had average daily gains similar (P>0.10) to those consuming diets containing 20 or 30% alfalfa hay and no WCGF. They also had improved feed efficiencies compared to heifers fed the diet containing 30% alfalfa hay and no WCGF (P < 0.05). Dry matter intake was not different among treatments (P>0.05) (11.4 ± .4 lb/day), so these results indicate a positive associative effect of WCGF on the digestibility of alfalfa hay in the diet containing 30% alfalfa hay and 40% WCGF. Increasing the level of alfalfa hay in the diet increased (P<0.01) dry matter intake as measured 2 hours after feeding (Figure 3), whereas increasing the level of WCGF decreased (P<0.01) dry matter intake. We conclude that the value of WCGF relative to steam-flaked corn increases in diets containing greater amounts of roughage when WCGF is included at 40% of the diet dry matter.

Table 1. Experimental Diets (% of Dry Matter)

	Treatments								
% Alfalfa Hay	10	10	10	20	20	20	30	30	30
Ingredients % WCGF	0	40	68	0	40	68	0	40	68
Steam-flaked corn	73.4	48.6	20.0	65.3	39.2	10.0	57.1	29.5	-
Alfalfa hay	9.8	9.9	10.0	19.6	19.9	20.1	29.5	30.0	30.3
Wet corn gluten feed	-	38.9	67.1	-	39.0	67.3	-	39.1	67.6
Soybean meal	9.0	-	-	7.6	-	-	6.2	-	-
Cane molasses	4.9	-	-	4.9	-	-	4.9	-	-
Urea	1.0	0.3	-	1.0	0.1	-	1.0	-	-
Limestone	1.2	1.6	2.3	0.8	1.2	2.0	0.5	0.9	1.6
Calcium phosphate	0.2	-	-	0.3	-	-	0.3	-	-
Sodium chloride	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Potassium chloride	-	0.2	0.1	-	0.1	0.1	-	-	-
Vitamin/trace mineral premix[a]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Crude protein, analyzed	16.1	16.5	20.1	16.1	16.8	20.8	16.1	17.0	21.4

[a]Formulated to provide (total diet dry matter): 1,200 IU/lb vitamin A, 0.1 ppm cobalt, 10 ppm copper, 0.6 ppm iodine, 60 ppm manganese, 0.2 ppm selenium, 60 ppm zinc and 30 g/ton of Rumensin.

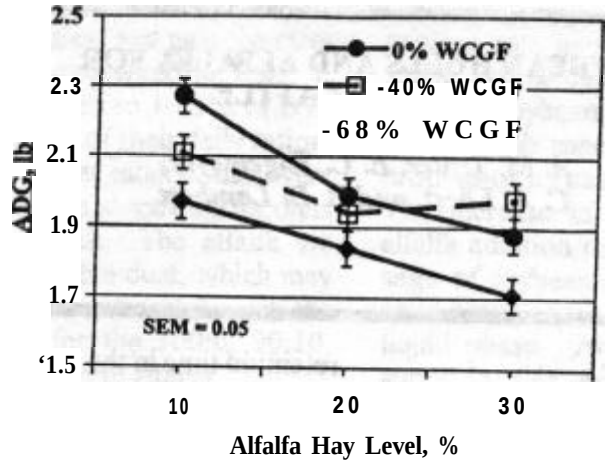

Figure 1. Average Daily Gain of Heifers Limit-Fed Growing Diets Containing 10, 20, or 30% Alfalfa Hay and 0, 40, or 68% Wet Corn Gluten Feed. Interaction between alfalfa hay and WCGF level in diet (P<0.05).

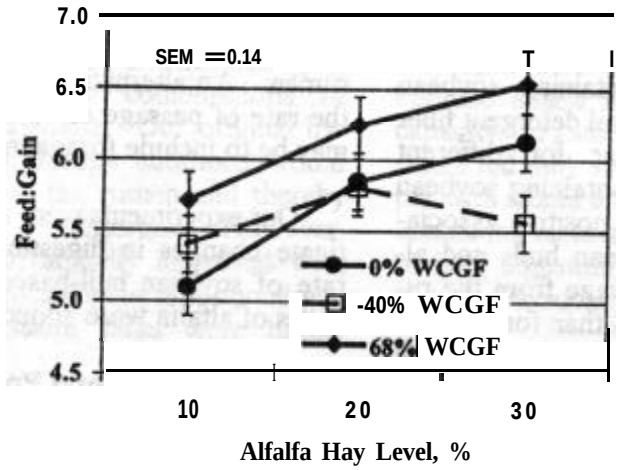

Figure 2. Feed:Gain of Heifers Limit-Fed Growing Diets Containing 10, 20, or 30% Alfalfa Hay and 0, 40, or 68% Wet Corn Gluten Feed. Interaction between alfalfa hay and WCGF level in diet (P<0.05).

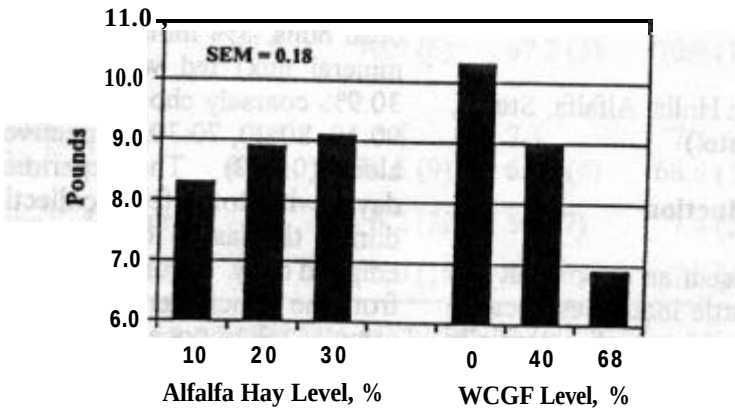

Figure 3. Dry Matter Intake as Measured Two Hours After Feeding. Linear effect of alfalfa hay (P<0.01) and linear effect of WCGF (P<0.0l).