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B.J. Healy

Robert T. Brandt Jr.

S.M. Gramlich

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# Effect of physical form and level of alfalfa in corn-based diets on performance of finishing steers

## Abstract

One hundred forty-four crossbred steers (850 lb) were used to evaluate the effects of physical form and level of average (15% CP) quality alfalfa on performance and carcass traits. Alfalfa hay had been harvested from a common field and alternate bales were either chopped (3 to 4 in. length) or ground and pelleted (3/8 in. pellet). No interactions between alfalfa form and level were detected. Daily gain, daily intake, feed efficiency, and carcass traits were similar for steers fed both alfalfa forms. Steers fed 10% alfalfa consumed 7.2% more feed ( $P < .03$ ) than those fed 5%. Steers fed 5% alfalfa had marginally improved feed efficiencies, whereas those fed 10% had somewhat greater daily gains. Carcass traits were not affected by level of alfalfa. The incidence and severity of liver abscesses were greater ( $P < .05$ ) for steers fed 5% alfalfa, indicative of a higher degree of acidosis than for steers fed 10% alfalfa.

## Keywords

Cattlemen's Day, 1993; Kansas Agricultural Experiment Station contribution; no. 93-318-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 678; Beef; Alfalfa; Hay; Pellets; Finishing steers

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# EFFECT OF PHYSICAL FORM AND LEVEL OF ALFALFA IN CORN-BASED DIETS ON PERFORMANCE OF FINISHING STEERS<sup>1</sup>

*B. J. Healy, R. T. Brandt, Jr., and S. M. Gramlich*

## Summary

One hundred forty-four crossbred steers (850 lb) were used to evaluate the effects of physical form and level of average (15% CP) quality alfalfa on performance and carcass traits. Alfalfa hay had been harvested from a common field and alternate bales were either chopped (3 to 4 in. length) or ground and pelleted (3/8 in. pellet). No interactions between alfalfa form and level were detected. Daily gain, daily intake, feed efficiency, and carcass traits were similar for steers fed both alfalfa forms. Steers fed 10% alfalfa consumed 7.2% more feed ( $P < .03$ ) than those fed 5%. Steers fed 5% alfalfa had marginally improved feed efficiencies, whereas those fed 10% had somewhat greater daily gains. Carcass traits were not affected by level of alfalfa. The incidence and severity of liver abscesses were greater ( $P < .05$ ) for steers fed 5% alfalfa, indicative of a higher degree of acidosis than for steers fed 10% alfalfa.

(Key Words: Alfalfa, Hay, Pellets, Finishing Steers.)

## Introduction

Previous research (1992 KSU Cattlemen's Day) suggested that high quality ( $> 23\%$  CP) alfalfa provides more ruminal tactile stimulation when fed as chopped hay than as a dehydrated pellet. However, it is not known if average quality alfalfa, similar to that more typically used in feedlot diets, would produce a similar response. Further, the previous

study evaluated 1/4" pellets, whereas 3/8" pellets, which may provide greater bulk and(or) ruminal tactile stimulation, were used in the present study. Although it is obvious that pelleting adds to processing costs, pelleted alfalfa is cheaper to haul, less dusty, and less prone to wind losses. Our objective was to determine the effects of alfalfa form and level on performance and carcass traits of finishing steers fed corn-based diets.

## Experimental Procedures

Alfalfa hay from a common field was harvested in July, 1992, sun-cured; and baled; alternate bales were either chopped (3 to 4 in. length) or ground and pelleted (3/8 in. pellet). The alfalfa was of average quality (15% CP). Both products were shipped to the Beef Research Unit, Manhattan. Chopped hay was stored in a covered hay shed, and pellets, in an overhead storage bin.

One hundred forty-four crossbred steers (850 lb), selected from a larger group of 387 based on uniformity in weight and breed type, were allocated to one of three weight blocks. Within each weight block, steers were allocated to one of four pens in a  $2 \times 2$  factorially arranged experiment. Main effects were alfalfa form (chopped or pelleted) and level (5 or 10% of ration DM, Table 1). Steers had been processed using standard procedures and had been adapted to full feed prior to initiating the trial. Diets did not contain tylosin. Initial weights were the averages of two consecutive, early morning

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<sup>1</sup>The cooperation of National Farms, Inc., Kansas City MO, who supplied cattle used in this study, is gratefully acknowledged.

weights. Final weights were taken once because of inclement weather and poor lot conditions. Steers were slaughtered at a commercial plant, and carcass data obtained following a 24-h chill. The trial was conducted from August 6 - December 10, 1992.

### Results and Discussion

No statistical interactions were detected between alfalfa form and level; thus, data were pooled across main effects. Steer performance and carcass traits were similar when comparing form of alfalfa fed, suggesting that ruminal bulk and(or) tactile stimulation were similar between chopped and pelleted alfalfa (Table 2). This contrasts with earlier KSU work that found slower gains and more indication of digestive upset when pellets were fed as compared to chopped hay. However,

the alfalfa used in the current study was lower in protein and likely had a lesser leaf:stem ratio, and pellet size was greater (3/8 in. vs 1/4 in.). Incidence and severity of liver abscesses tended to be greater for steers fed pelleted vs chopped alfalfa hay.

Steers fed 10% alfalfa consumed 7.2% more feed ( $P < .03$ ) than those fed 5% alfalfa (Table 2). Daily gains were slightly greater for steers fed 10% alfalfa. However, steers fed 5% alfalfa were slightly more efficient (6.98 vs 7.21). Carcass traits were not different between steers fed 5 or 10% alfalfa, but severity of liver scores was markedly greater ( $P < .05$ ) for steers fed 5% alfalfa. These results, combined with those from the earlier study, indicate that the maturity and/or pellet size of alfalfa influences ruminal bulk and(or) tactile stimulation.

**Table 1. Diet Compositions<sup>a</sup>**

| Ingredient              | Chopped alfalfa |       | Pelleted alfalfa |       |
|-------------------------|-----------------|-------|------------------|-------|
|                         | 5%              | 10%   | 5%               | 10%   |
| Dry rolled corn         | 84.96           | 81.10 | 85.62            | 81.28 |
| Chopped alfalfa         | 5.00            | 10.00 | ---              | ---   |
| Pelleted alfalfa        | ---             | ---   | 5.00             | 10.00 |
| Supplement <sup>b</sup> | 7.54            | 6.54  | 6.88             | 6.22  |
| Molasses                | 2.50            | 2.50  | 2.50             | 2.50  |

<sup>a</sup>DM basis.

<sup>b</sup>Supplements were formulated so that diets contained 12% CP, .7% Ca, .3% P, .7% K, 1550 IU Vit A, and 31 ppm monensin.

**Table 2. Effect of Alfalfa Physical Form and Level on Performance and Carcass Traits of Steers**

| Item                      | Alfalfa form |          | Alfalfa level, % of DM |                   | SEM |
|---------------------------|--------------|----------|------------------------|-------------------|-----|
|                           | Chopped      | Pelleted | 5%                     | 10%               |     |
| No. pens                  | 6            | 6        | 6                      | 6                 |     |
| No. steers                | 72           | 72       | 72                     | 72                |     |
| Initial wt, lb            | 849          | 848      | 849                    | 848               |     |
| Final wt, lb <sup>a</sup> | 1188         | 1174     | 1176                   | 1187              | 6.3 |
| Daily gain, lb            | 3.11         | 3.00     | 3.01                   | 3.11              | .05 |
| Daily feed, lb DM         | 22.0         | 21.3     | 20.9 <sup>d</sup>      | 22.4 <sup>e</sup> | .25 |
| Feed/gain                 | 7.07         | 7.11     | 6.98                   | 7.21              | .09 |
| <u>Carcass traits</u>     |              |          |                        |                   |     |
| Hot wt, lb                | 760          | 751      | 751                    | 760               | 4.4 |
| Backfat, in               | .43          | .46      | .43                    | .46               | .01 |
| KPH, %                    | 2.28         | 2.28     | 2.29                   | 2.28              | .02 |
| Marbling <sup>b</sup>     | 5.23         | 5.09     | 5.19                   | 5.14              | .66 |
| Percent Choice            | 68.1         | 65.3     | 68.1                   | 65.3              |     |
| Liver abscesses           |              |          |                        |                   |     |
| Incidence, %              | 40.0         | 48.5     | 55.1 <sup>d</sup>      | 33.3 <sup>e</sup> |     |
| Severity <sup>c</sup>     | 1.0          | 1.3      | 1.4 <sup>d</sup>       | .8 <sup>e</sup>   | .09 |

<sup>a</sup>Pencil shrunk 4 %.

<sup>b</sup>4 = slight, 5 = small, 6 = modest.

<sup>c</sup>Normal = 0, severe = 3.

<sup>d,e</sup>Means in a row with unlike superscripts differ ( $P < .05$ ).