

VITAMIN E SUPPLEMENTS FOR FEEDLOT STEERS

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Story in Brief

The effects of Vitamin E (E) supplementation of finishing diets composed of high moisture corn was investigated. Ninety-six Limousin crossbred steers were blocked by weight and assigned randomly to one of two treatments. Each steer received either 100 (LO) or 300 IU (HI) vitamin E/d for the 135 d feeding period. Feed intake and gain did not differ at any time during the trial. However, efficiency was improved by 1.6% for cattle fed the higher level of vitamin E. Diet DM and starch digestibilities, using chromic oxide as an indigestible dietary marker, were not altered by E although protein digestibility tended to be least for LO; starch concentration in feces tended to be greater for HI than LO. Compared with HI, LO had higher fecal protein concentration. The cattle were slaughtered at a commercial packing facility where individual carcass data were collected after a 48-h chill. HI cattle had higher marbling scores, more back fat and tended to have a higher calculated yield grade than calves fed the lower levels. HI cattle tended to have more carcasses grade Choice and fewer grade Standard. Longissimus dorsi muscle sections were used for determination of shelf life characteristics and toughness measurements. More steaks from LO cattle were classified as tender (75.0 vs. 58.3 %) than those taken from HI cattle. Rate of discoloration of meat sections exposed to cool white light was delayed by at least 24 h with the higher level of E.

(Key Words: Cattle, Shelf-life, Carcass.)

Introduction

The National Cattlemen's Association recently has advocated the addition of vitamin E to feedlot diets, because it enhances meat stability. Due to the high cost (\$.02/1,000 IU) of vitamin E, cattle producers have been reluctant to include it in feedlot diets. Recent reviews (Williams et al. 1993, Secrist et al. 1995) indicate that vitamin E supplementation also may enhance feedlot performance. The purpose of this trial was to investigate the effects of vitamin E supplementation on performance and carcass quality of feedlot steers and color stability and tenderness of meat from these steers.

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Materials and Method

Animals: Limousin crossbred steers (96) from Oklahoma were hauled to Guymon, OK on January 12, 1994. The cattle were vaccinated with a MLV 4-way respiratory vaccine and implanted with Revalor-S®. On January 27, 1994 (d 0) the cattle were transported 15 miles to the Panhandle State University research facility at Goodwell, OK. The cattle were weighed, stratified by weight into two weight blocks (heavy and light) and assigned randomly to one of two treatments. Vitamin E was administered at two levels by top dressing a corn-based pellet (1 lb/pen) each d containing either 800 or 2400 IU vitamin E/lb. The calves were housed (8 calves/pen) in 12 outside pens with covered feed bunks. Each treatment had six pens (three heavy reps and three light reps).

Diets. High concentrate (92%), high moisture corn diets (Table 1) were available free choice. Dry ground corn, the carrier for the vitamin E, was pelleted after the vitamin E was added. Fed at rate of 1 lb/pen, it provided 100 or 300 IU vitamin E/steer daily.

Data Collection. The calves were weighed on d 28, 63, 121 and 138. Feed samples were taken on each weigh day. Cottonseed hull-based pellets containing chromic oxide were fed d 89 to 99. Fecal samples were collected from the pen on d 97 (PM), 98 (AM and PM) and 99 (AM). Fecal samples were composited across and analyzed for starch, protein and chromium content. Total tract digestibilities crude protein and starch were calculated. The heavy replicate group was killed at Monfort Packing Plant at Dumas, TX on d 128. Carcass data were collected after a 24 hr. chill. The light replicate group was killed at Excel, Dodge City, KS on d 144. Carcass data were collected and rib sections were obtained for further study after a 48-h chill. Longissimus dorsi muscle sections were aged for 14 d after which Warner-Bratzler shear force was used to determine toughness, and steaks were exposed in a meat case under cool white light for 14 d. During this time, percentage of exposed surface discolored was recorded daily.

Results and Discussion

Cattle Performance. Performance data are summarized in Table 2. Feed intake did not differ due to treatment. ADG was slightly greater when the higher level of E was fed, but the difference was not significant. Feed efficiency tended to be enhanced with HI compared with LO ($P=.15$) during the first 61 d on feed. Feed efficiency did not differ during the last half of the feeding period. Overall, efficiency was improved ($P=.05$) by feeding the greater level of E. The need for supplemental E may be dependent on animal stress

level and growth rate. Though these cattle did not experience severe weather or shipping stress, the stress associated with handling and confinement as well as rapid growth may have increased the need for supplemental E.

Carcass Characteristics. Carcass data are summarized in Table 3. HI cattle tended to have a heavier carcass ($P=.36$) and more backfat ($P=.07$) than LO cattle. Marbling was enhanced ($P=.02$) by supplemental E. More calves graded Choice ($P=.12$) and fewer graded Standard ($P=.04$) when the higher level of E was fed. These data support the trend for increased animal performance reported earlier. Increased efficiency appears to be reflected in increased fat deposition and therefore would equate to fewer d on feed required to produce an acceptable carcass. However, shear force results (Table 3) indicate that increased vitamin E decreased tenderness. Other data do not support this effect on shear force (Arnold et al. 1992). Shelf life was extended one d by higher vitamin E supplementation ($P=.02$).

Digestibility. Digestibility data are summarized in Table 4. A trend for increased protein digestibility was observed with the HI supplemented cattle. No significant difference was noted in total tract or starch digestibility. The apparent increase in cattle performance or fat deposition cannot be explained by an increase in diet digestibility.

Literature Cited

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