Project Title: Use of Vitamin D_3 and its Metabolites to Improve Beef

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Completion Date: November 2000

Layman's Summary:

The experiment objective was to determine whether feeding beef cattle vitamin D_3 or two compounds biosynthesized from vitamin D_3 (25-hydroxyvitamin D_3 and 1.25-dihydroxyvitamin D_3) can improve the tenderness of beef. Preliminary experiments were conducted to determine the optimal dose of each of the two derivatives of vitamin D and the best time to harvest the steers after feeding the derivatives. Four days after feeding 125 mg of 25-hydroxyvitamin D_3 and three days after feeding 500mg of 1.25-dihydroxyvitamin D_3 were the respective optimal kill times and dosages. Results indicate that vitamin D_3 and 25-hydroxyvitamin D_3 but not 1.25-dihydroxyvitamin D_3, decrease Warner-Bratzler shear and increased the 30kD protein (measures of tenderness) of relatively tender strip loins and rounds. Feeding supplemental vitamin D_3 causes an increase in the vitamin D_3 content of beef, which causes some concern. However, the feeding of the two vitamin D_3 metabolites does not cause a residue concern. Therefore, this experiment suggests that antemortem feeding of 25-hydroxyvitamin D_3 is an effective and easy way to increase tenderness of beef and may improve overall beef palatability. Future research is warranted to refine the dosages of each of the vitamin D_3 metabolites and to determine optimum administration time prior to slaughter in order to achieve maximal tenderization effect.

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