

Project Title: Use of Vitamin D₃ and its Metabolites to Improve Beef Tenderness

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Layman's Summary:

The experiment objective was to determine whether feeding beef cattle vitamin D₃ or two compounds biosynthesized from vitamin D₃ (25-hydroxyvitamin D₃ and 1.25-dihydroxyvitamin D₃) 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 D₃ and three days after feeding 500mg of 1.25-dihydroxyvitamin D₃ were the respective optimal kill times and dosages. Results indicate that vitamin D₃ and 25-hydroxyvitamin D₃ but not 1.25-dihydroxyvitamin D₃, decrease Warner-Bratzler shear and increased the 30kD protein (measures of tenderness) of relatively tender strip loins and rounds. Feeding supplemental vitamin D₃ causes an increase in the vitamin D₃ content of beef, which causes some concern. However, the feeding of the two vitamin D₃ metabolites does not cause a residue concern. Therefore, this experiment suggests that antemortem feeding of 25-hydroxyvitamin D₃ 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 D₃ metabolites and to determine optimum administration time prior to slaughter in order to achieve maximal tenderization effect.

