

81 Use of 25-hydroxyvitamin D₃ to improve tenderness of beef from distiller's co-product-supplemented pasture- and feedlot-finished beef steers. R. C. Knock*¹, A. H. Trenkle¹, E. J. Huff-Lonergan¹, S. M. Lonergan¹, J. R. Russell¹, K. M. Carnagey², and D. C. Beitz¹, ¹Iowa State University, Ames, ²Wake Forest University School of Medicine, Winston-Salem, NC.

British breed beef steers (n = 48; 370 kg) were assigned to pasture or feedlot diets and one of two concentrations of 25-hydroxyvitamin D₃ (VITD; 0 or 500 mg) to evaluate the effects of VITD and distiller's co-product supplementation on performance, carcass traits, beef tenderness and beef color. All steers were implanted with a combination trenbolone acetate/estradiol implant prior to diet initiation. Pasture-finished cattle received 6.8 kg/hd per day of pelleted distiller's grains, wheat midds, and soy hulls while continuously grazing predominantly bromegrass pasture. The feedlot diet contained 10% wet distiller's grains in addition to corn, corn silage, and chopped hay. Steers from both diets also received monensin. Steers were harvested after 112, 133, or 154 d on feed (DOF) to minimize 12th rib fat differences. Twelve steers from each dietary treatment received 25-hydroxyvitamin D₃ boluses orally 7 d prior to assigned harvest date. Longissimus (LM), semimembranosus (SM), and gracilis (GR) muscles were collected, cut into steaks, aged 3, 7, or 14 d, and evaluated for instrumental color and Warner-Bratzler shear force (WBSF). Calpastatin activity was analyzed at d 3 postmortem. At harvest, feedlot steers were heavier ($P = 0.0370$; 584 kg; 132 DOF) than pasture-fed steers (563 kg; 130 DOF) and had greater ADG ($P < 0.0001$; 1.74 vs. 1.51 kg/d). Pasture-fed steers had less 12th rib fat ($P < 0.0001$; 6.1 vs 8.7 mm) and kidney, pelvic, and heart fat ($P = 0.0108$; 1.64 vs. 1.83%), however neither diet nor VITD affected final yield grade ($P = 0.1014$). In addition, pasture-finished steers had lower ($P = 0.0141$) marbling scores than did feedlot steers (Slight45 vs. Slight90). Calpastatin activity on d 3 postmortem differed by muscle ($P < 0.0001$) with GR having the greatest activity followed by the LM and SM (2.65, 2.08, and 1.82 units of activity/g tissue, respectively), but was not affected by VITD or diet. WBSF decreased with increased aging times for the LM and GR, whereas the SM was most tender on d 7. Neither VITD nor diet affected WBSF. GR and LM had greatest b* values on d 14 and the SM had greatest b* on d 3. Feedlot steers had greater a* values compared with pasture-fed steers (22.67 vs. 22.24; $P = 0.0318$), indicating increased redness. The a* values differed by muscle ($P < 0.0001$) as GR had the greatest a* values followed by the SM and LM (23.22, 22.25, and 21.90, respectively). L* values increased with increased aging time. VITD supplementation did not impact WBSF in this study; however, it is possible that hypercalcemia was not achieved or was not present at harvest, which would not lead to the increased calpain activity and therefore the improved tenderness that was expected to result from this treatment. Nonetheless, data indicate it is possible to finish steers on pasture by supplementing with distiller's co-products without substantially increasing time needed to reach market weights when compared with feedlot finishing. This research was supported by the National Cattlemen's Beef Association.