



## RESEARCH BRIEF PRODUCT QUALITY

## BEEF RESEARCH

### Effect of Growth-promoting Technologies on *Longissimus lumborum* Muscle Fiber Morphometrics, Collagen Solubility, and Cooked Meat Tenderness

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#### Abstract

The objective of the study was to examine the effect of growth-promoting technologies (GP) on *Longissimus lumborum* steak tenderness, muscle fiber cross-sectional area (CSA), and collagen solubility. Crossbred feedlot heifers (n = 33; initial BW 464 ± 6 kg) were blocked by BW and assigned to 1 of 3 treatments: no GP (CON; n = 11); implant, no zilpaterol hydrochloride (IMP; n = 11); implant and zilpaterol hydrochloride (COMBO; n = 11). Heifers assigned to receive an implant were administered Component TE-200 on d 0 of the study, and the COMBO group received 8.3 mg/kg DM of zilpaterol hydrochloride for the final 21 d of feeding with a 3 d withdrawal period. Following harvest, strip loins were collected and fabricated into 4 roasts and aged for 3, 14, 21, or 35 d postmortem. Fiber type was determined by immunohistochemistry. After aging, objective tenderness and collagen solubility were measured. There was a treatment × day of aging (DOA) interaction for Warner-Bratzler shear force (WBSF; P < 0.01). At d 3 of aging, IMP and COMBO steaks had greater WBSF than CON steaks (P < 0.01). By d 14 of aging, the WBSF of IMP steaks was not different (P = 0.21) than CON steaks, but COMBO steaks had greater shear values than steaks of other treatments (P < 0.02). The COMBO steaks only remained tougher (P = 0.04) than the CON steaks following 35 DOA. Compared to CON muscles, IMP and COMBO type I and IIX muscle fibers were larger (P < 0.03). Treatment, DOA, or the two-way interactions did not impact measures of total and insoluble collagen (P > 0.31). Soluble collagen amount tended to be affected (P = 0.06) by a treatment × DOA interaction which was due to COMBO muscle having more soluble collagen than the other 2 treatments on d 21 of aging (P < 0.02). Correlation analysis indicated that type I, IIA, and IIX fiber CSA are positively correlated with WBSF at d 3 and 14 of aging (P < 0.01), but only type IIX fibers are correlated at d 21 and 35 of aging (P < 0.03). At these time periods, total and insoluble collagen became positively correlated with WBSF (P < 0.01). This would indicate that relationship between muscle fiber CSA and WBSF decreases during postmortem aging, while the association between WBSF and collagen characteristics strengthens. The use of GP negatively impacted meat tenderness primarily through increased muscle fiber CSA and not through altering collagen solubility.

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