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BEEF RESEARCH

Effects of Anabolic Implants and Ractopamine-HCl on Muscle Fiber Morphometrics, Collagen Solubility, and Tenderness of Beef *longissimus lumborum* Steaks

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Abstract

The objective of this study was to examine the effects of growth-promoting technologies (GP) and postmortem aging on *longissimus lumborum* muscle fiber cross-sectional area (CSA), collagen solubility, and their relationship to meat tenderness. Two groups of black-hided crossbred feedlot heifers (group 1: n = 33, initial BW 430 ± 7 kg; group 2: n = 32, initial BW 466 ± 7 kg) were blocked by BW and assigned to 1 of 3 treatments consisting of: no implant and no ractopamine hydrochloride (CON; n = 21); implant, no ractopamine hydrochloride (IMP; n = 22); implant and ractopamine hydrochloride (COMBO; n = 22). Heifers that received an implant were administered an implant containing 200 mg trenbolone acetate and 20 mg estradiol on d 0 of the study, and heifers in the COMBO group received 400 mg·head⁻¹·d⁻¹ of ractopamine hydrochloride for 28 (Group 1) or 29 d (Group 2) at the end of 90- (Group 1) or 106-d (Group 2) feeding period. Following harvest, strip loins were collected and further fabricated into 5 roasts for postmortem aging (DOA) periods of 2, 7, 14, 21, or 35 d. After aging, Warner-Bratzler shear force (WBSF), muscle fiber CSA, and collagen solubility were measured. There was no treatment × DOA interaction for WBSF (P = 0.86), but treatment and DOA impacted WBSF (P < 0.01). Over the entire aging study, COMBO steaks had greater (P < 0.01) shear force values when compared to CON steaks. The IMP steaks tended to have decreased (P = 0.07) shear force when compared to the COMBO steaks, but did not differ (P = 0.11) from CON steaks. The IMP and COMBO treatments had increased type IIA fiber CSA when compared to CON (P < 0.01). When compared to each other, the IMP and COMBO type IIA fiber CSA did not differ (P = 0.76). Type I and IIX fiber CSA tended to be greater than CON for IMP and COMBO treatments (P < 0.10). There was no treatment × DOA interaction for all collagen measures (P > 0.33). Collagen amounts were not impacted by GP treatment (P > 0.72), but DOA increased the concentration of soluble collagen (P = 0.04). Fiber CSA of all fiber types were positively correlated (P < 0.05; r = 0.21 to 0.28) with WBSF only on d 2 of aging, while soluble collagen amount tended to negatively correlate with WBSF on d 7 and 14 of aging (P < 0.10; r = -0.24 and -0.23, respectively). Administration of GP during heifer finishing resulted in greater steak WBSF over 35 d of aging, which was not due to collagen characteristics and only minimally affected by fiber CSA.

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