



Influence of Post-Harvest Circulatory Rinse on Tenderness and Objective Color of Cow Striploin Steaks

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Objectives

Whole muscle cuts from cows are often less tender than cuts from young fed beef due to increased collagen cross-linking associated with animal age. The injection of a rinse solution through the carotid artery following exsanguination has been shown to improve tenderness. The objective of this study was to compare the effect of a post-harvest rinse of an isotonic solution through the circulatory system on tenderness of steaks from cows.

Materials and Methods

Cows ($n = 28$) were randomly assigned to carcass treatments. The carcass treatments consisted of non-rinsed control ($n = 14$) and a rinsed ($n = 14$) treatment, where a chilled isotonic solution (MPSC, Inc., St. Paul, MN) was rinsed through the carotid artery and veins following exsanguination. The isotonic solution consisted of water, glucose, maltose and phosphates. Both control and rinsed treatments were electrically stimulated. At 2 d postmortem, strip loins were removed from one side of each carcass. Strip loins were fabricated into 2.54 cm steaks at 3 d postmortem and objective color measurements (L^* , a^* and b^*) were recorded on a single steak after a 30-min bloom period. Steaks were vacuum packaged and aged at 4°C for 7, 14, and 21 d. Following aging, steaks were frozen (−20°C) for future analysis. Warner-Bratzler Shear Force (WBSF) was used to measure tenderness. Frozen steaks were thawed at 4°C for 24 h before cooking. Internal temperature was monitored on all steaks using a digital thermometer that was placed in the center of each steak. Steaks were cooked on an electric clamshell grill to an internal tem-

perature of 71°C. Peak cook temperature was recorded for each steak. Following cooking, steaks were cooled at 4°C and allowed to equilibrate to room temperature (20°C). Six cores (1.27 cm) were removed from each steak and sheared perpendicular to the muscle fiber orientation. The peak force was recorded for each core and the average calculated for each steak. Data were analyzed using the MIXED procedure of SAS (SAS Inst. Inc., Cary, NC). Shear force data were analyzed as a repeated measure with time and treatment as fixed variables. Color data were analyzed as a completely randomized design using treatment as the fixed variable. Statistical significance was considered at an α of $P < 0.05$ and trends at $0.05 \leq P < 0.10$.

Results

There was no interaction ($P = 0.6068$) between treatment and postmortem aging day. Steaks from the rinsed treatment were more tender ($P = 0.0005$), than steaks in the control treatment (3.51 ± 0.168 kg vs. 4.41 ± 0.174 kg, respectively). Postmortem aging influenced ($P = 0.0310$) tenderness. Steaks aged 7 d were less tender ($P = 0.0087$) than steaks aged for 21 d (4.18 ± 0.155 kg vs. 3.72 ± 0.156 kg, respectively), while 14 d steaks did not differ ($P > 0.05$) from those aged 7 or 21 d. Objective color was not impacted by rinse treatment ($P > 0.05$).

Conclusion

These data suggest that the application of a post-harvest rinse with an isotonic solution through the circulatory system improves the tenderness of cow steaks but does not influence objective color.