EXTENSION
BEEF CATTLE RESEARCH UPDATE
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Comparison of Meat Quality and Health Implications of Branded and Commodity Beef

Conventionally produced beef originates from cattle raised predominantly on forages for 12 to 18 months before finishing on high-concentrate diets for 120 to 200 days before slaughter. In addition, conventionally produced beef uses efficiency enhancing technologies (growth implants, beta agonists, and ionophores). Over the past 20 years, beef products have been marketed as some variation of "naturally raised" (no growth promotants or antibiotics, grass finished, or fed an all-vegetarian diet) as options for health-conscious consumers.[1] University of Arkansas researchers conducted a study to compare quality characteristics of fresh and cooked steaks from "naturally raised" beef with those of commodity beef from conventionally fed cattle with similar marbling specifications.[2] This study also compared the presence of antibiotic residues in "naturally raised" beef programs vs. commodity beef.

In this study, fresh, vacuum-packaged ribeye rolls from USDA Choice (Modest and Moderate degrees of marbling) beef carcasses were purchased from 5 branded programs (natural; 10 per program) and 2 major beef packing companies (conventional; 10 per company) and shipped under refrigeration to the University of Arkansas Red Meat Abattoir (Fayetteville, AR). The conventional beef was defined as undifferentiated beef from cattle raised under conventional production systems that may (or may not) have received antibiotics, steroid growth implants, or beta agonists, whereas natural beef was from cattle produced with no hormone implants or beta agonists and that received no dietary antibiotic or ionophore inclusion. Other than the specification of quality grade, there was no knowledge of breed type, but all cattle were specified to have been slaughtered under 30 months of age. All ribeye rolls arrived within a 5-day period, and boxes were opened, each vacuum-packaged ribeye roll was inspected to ensure package integrity, and ribeye rolls were aged in the dark at 35.6°F for 14 days from the box date.

These researchers reported even though natural steaks were lighter in color than conventional steaks, fresh color and fatty acid composition were quite similar between conventional and natural beef. Steaks from conventional ribeye rolls had greater cooking losses than steaks from natural ribeye rolls. However, neither Warner-Bratzler shear-force values (measure of tenderness) nor consumer panelists' sensory ratings differed ($P \geq 0.166$) between the 2 types of beef. Surprisingly, Penicillin G residues were detected in two natural steaks (5.0 and 28.5 ng/g, respectively). These levels were below the maximum residue limit of 50 ng/g in uncooked beef. No antibiotic residues were detected in the conventional steaks. These authors suggested that the detection of these two natural steaks with penicillin residues is likely due to either prescribed, extra label administration at a dose greater than the approved label or cattle being sent to slaughter before the recommended 10- to 14-day withdrawal period.

These researchers concluded that the "results of this study indicate that there are no tangible differences between conventional and natural beef. Results were obtained from a small sampling of conventional ribeye rolls. With the exception of the "naturally raised"

specifications, little was known about cattle breed types, feedstuff composition of diets, time on feed, slaughter endpoints, and carcass weights."

[1] Thilmany, D.D., W.J. Umberger, and A.R. Ziehl. 2006. Strategic market planning for value-added natural beef products: A cluster analysis of Colorado consumers. Renew. Agric. Food Syst., 21:192-203.

[2] Keys, C. A., J. K. Apple, J. W. S. Yancey, R. J. Stackhouse, T. M. Johnson, L. N. Mehall and M. L. Looper. 2020. Comparison of meat quality and health implications of branded and commodity beef. Appl. Anim. Sci. 36: 135-144.