

2018 Reciprocal Meat Conference – Meat and Poultry Quality

Meat and Muscle Biology™



Quality Effects of Beef from Cattle Fed High-Protein Corn Distillers Grains and Other Ethanol By-Products

K. Hart*, F. Ribeiro, M. Henriott, N. Herrera, and C. Calkins

Department of Animal Science, University of Nebraska– Lincoln, Lincoln, NE, 68588, USA

*Corresponding author. Email: kbhgolf@verizon.net (K. Hart)

Keywords: distillers grains, fatty acid composition, high protein
Meat and Muscle Biology 2(2):100

doi:10.221751/rmc2018.090

Objectives

This research was conducted to evaluate the effects of feeding high protein corn distillers grains on beef tenderness during aging, sarcomere length, pH, proximate composition, and fatty acid composition

Materials and Methods

Steers ($n = 300$) were fed for 190 d on either a corn control, 40% high protein dry distillers grains plus solubles (HP-DDGS), 40% dry distillers grains plus solubles (DDGS), 40% wet distillers grains plus solubles (WDGS), or 40% bran plus solubles (Bran) diet. Eighteen Choice carcasses (3 head/pen) were randomly selected within each treatment ($n = 90$). Strip loin samples from the right side were collected and aged for 2, 9, or 23 d. Steaks were fabricated at each aging period and placed under retail display conditions for 0 or 7 d. Tenderness (Warner-Bratzler shear force), sarcomere length, pH, proximate composition, and fatty acid composition were determined. Data were analyzed using the PROC GLIMMIX procedure of SAS (SAS Inst. Inc., Cary, NC) and pen was the experimental unit.

Results

Hot carcass weight at harvest was 391 kg (SD 31.6 kg). Steaks aged 2 d showed no difference ($P = 0.17$) in tenderness across treatments, however a display effect

($P < 0.0001$) was present. Steaks that were under retail display conditions for 7 d exhibited a lower Warner-Bratzler shear force value than steaks not placed in retail display (3.40 kg and 4.27 kg, respectively). Steaks aged for 9 d and 23 d exhibited no differences across treatments ($P = 0.14$), however there was a significant age by treatment effect ($P = 0.01$). As HP-DDGS, DDGS, and Bran increased in aging an increase of tenderness was observed. There was no difference ($P > 0.05$) in tenderness between HP-DDGS and corn across aging periods. Retail display increased tenderness for steaks from 9 d and 23 d ($P < 0.0001$). No differences were observed among treatments for sarcomere length ($P = 0.07$), fat ($P = 0.51$), moisture ($P = 0.71$), or ash ($P = 0.74$). An aging effect was found for pH ($P < 0.0001$), however, the values were of little practical significance (5.49 23 d, 5.48 2 d, 5.44 9 d, respectively). Preliminary results suggest beef from cattle fed HP-DDGS had significantly higher ($P = 0.03$) levels of 18:2 in muscle than cattle fed corn (480.61 mg/100g vs. 272.49 mg/100g). All other treatments presented intermediate levels of 18:2 (395.92 mg/100g for DDGS, 350.06 mg/100g for WDGS, and 321.53 mg/100g for Bran). Cattle fed corn had significantly more ($P = 0.03$) 17:1 in their muscle when compared to Bran (85.51 mg/100g vs. 57.76 mg/100g).

Conclusion

These results suggest that feeding high protein distillers grains have no detriment on tenderness, but may alter the lipid profile of the muscle.