



Evaluation of Pearl Millet With and Without Soybean Hull Supplementation for Forage-Finished Beef Production Systems

R. W. Mckee^{1*}, D. D. Harmon¹, D. W. Hancock¹, L. Stewart², W. M. Sims², M. Rigdon², C. L. Thomas², and A. M. Stelzleni²

¹Crop and Soil Science, University of Georgia, Athens, GA, USA

²Animal and Dairy Science, University of Georgia, Athens, GA, USA

*Corresponding author. Email: rwmckee@uga.edu (R. W. Mckee)

Keywords: forage-finished beef, pearl millet, soybean hulls
Meat and Muscle Biology 3(2):27

Objectives

The objective of this research was to evaluate pearl millet, a warm-season annual grass, with and without soybean hull supplementation for forage-finished beef production systems in the Southeast.

Materials and Methods

Each year, 32 Angus-crossbred steers (339 ± 40 kg) were randomly assigned to one of four finishing treatments. Treatments were arranged in a 2×2 factorial and included two varieties of pearl millet, 'Tifleaf 3' (PM) and 'Exceed' brown mid-rib (BMR), and two levels of soybean hull supplementation, 0 and 0.75% of body weight d^{-1} . Steers were on treatments for 90 and 84 d during the summers of 2017 and 2018, respectively, at the University of Georgia Department of Animal and Dairy Science Beef Research Unit located near Eatonton, GA. Shrink weights were taken at initiation and termination of the finishing period and average daily gains (ADG) were calculated. At the end of the finishing period, steers were harvested under USDA inspection and carcass data was collected 24 h postmortem from the right side of each carcass. Striploins were then removed from the right side, vacuum packed, and allowed to age for 21 d prior to fabrication. Striploins were fabricated into 2.54-cm steaks and allocated to meats proximate ($n = 1$), 0 through 7 d of simulated shelf life ($n = 8$), trained sensory panel ($n = 2$), and instrumental tenderness analyses ($n = 2$). All data were analyzed using PROC GLIMMIX in SAS v. 9.4.

Results

Supplementation increased ADG over forage alone ($P < 0.01$) however, hot carcass weights were increased by supplementation in the PM steers only ($P < 0.05$). No treatment differences were observed for marbling score ($P = 0.61$), overall maturity ($P = 0.49$), 12th rib fat thickness ($P = 0.21$), ribeye area ($P = 0.1668$), and subjective fat color ($P = 0.93$). Objective carcass lean color values for L^* and subjective lean color scores were different ($P < 0.05$). Treatment effects were also observed for carcass lean maturity scores ($P < 0.05$). No treatment differences were observed for meats proximate analysis ($P > 0.05$), instrumental tenderness as measured by Warner-Bratzler shear force ($P = 0.94$), initial and sustained tenderness ($P = 0.66$ and $P = 0.29$, respectively), beef and off-flavor intensities ($P = 0.83$ and $P = 0.36$, respectively), or juiciness ($P = 0.54$) as measured by a trained sensory panel. No treatment differences ($P > 0.05$) were observed for lipid oxidation or color change (Delta E) within any day of simulated shelf life. Calculated values for hue, chroma, and redness were unaffected ($P > 0.05$) by treatment within day of simulated shelf life.

Conclusion

Results indicate pearl millet is a viable forage option for forage-finished beef systems and soybean hull supplementation improves animal performance over forage alone with minimal impacts on carcass characteristics, meat quality, and shelf life.