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The Effects of Finishing Diet and Enhancement on the Composition and Objective Measures of Tenderness of Honduran Beef

N. C. Hardcastle*, A. J. Garmyn, J. F. Legako, M. M. Brashears, and M. F. Miller

Texas Tech University, Lubbock, TX, 79409, USA

*Corresponding author. Email: nicholas.hardcastle@ttu.edu (N. C. Hardcastle)

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Objectives

The objective of this study was to evaluate the effects of finishing diet and enhancement on the composition and objective tenderness of Honduran beef.

Materials and Methods

Bos indicus cross bred bulls ($n = 105$) were fed experimental finishing diets in Honduras, consisting of either a traditional grass-finished control (CON; $n = 15$) or a diet with the inclusion of distiller's dry grain (DDG; $n = 15$), palm kernel meal (PKM; $n = 15$), a PKM replication (PKMR; $n = 15$), sorghum (SORG; $n = 15$), soybean meal and corn (SBMC; $n = 15$), or sugarcane (SC; $n = 15$). After finishing, cattle were harvested at a commercial beef abattoir in Honduras and chilled for 18 h at 0 to 4°C. Paired strip loins were collected from each carcass. One loin was enhanced (ENH) to 112.5% of green weight with water, 0.5% NaCl, 0.25% sodium tripolyphosphate, and 0.02% maltodextrin, and the other remained untreated and was designated as non-enhanced (NE). Both loins were fabricated into steaks, aged for 21 d, and the second most anterior steak was transported frozen to the Texas Tech University Gordon W. Davis meat science laboratory for slice shear force (SSF), raw ultimate pH, cooked proximate, and cooked sarcomere length analyses. Data were analyzed using PROC GLIMMIX in SAS (version 9.4, SAS Inst. Inc., Cary, NC) with fixed effects of diet, enhancement, and their interaction at a significance level of $\alpha = 0.05$. Cooking loss was included as a covariate for SSF ($P < 0.05$).

Results

Diet and enhancement interacted ($P < 0.01$) to influence SSF values. Enhancement reduced ($P < 0.05$) the

SSF values of beef from the animals finished on PKM, PKMR, SC and SORG compared to their NE counterparts, but enhancement had no effect ($P > 0.05$) on SSF values of steaks from the remaining diets. No interaction was observed ($P > 0.05$) for raw ultimate pH, cooked sarcomere length, or cooked proximate components. However, pH was influenced ($P < 0.01$) by both diet and enhancement. Enhanced loins possessed a greater ($P < 0.01$) pH compared to their NE counterparts. Moreover, diet also influenced ($P < 0.01$) the ultimate pH of samples, regardless of enhancement, as CON had a greater ($P < 0.05$) ultimate pH than all other treatments. Diet influenced ($P = 0.02$) sarcomere length, while no difference was observed between ENH and NE samples ($P > 0.05$). Sorghum and SC had shorter sarcomeres than SBMC ($P < 0.05$); however, SBMC sarcomere length was similar ($P > 0.05$) to all other diets. Enhancement had no effect ($P \geq 0.07$) on proximate composition; however, fat, protein, moisture, and ash were each impacted by finishing diet ($P < 0.05$). Beef from CON and SORG had lower fat percentage ($P < 0.05$) than all other treatments, but SORG was similar ($P > 0.05$) to SBMC. Distiller's dry grain had a lower ($P < 0.05$) protein percentage than all other diets, except PKMR and CON, which were similar ($P > 0.05$). Distiller's dry grain had greater moisture ($P < 0.05$) than most other treatments except CON and PKMR ($P > 0.05$). Lastly, SORG had the greatest ($P < 0.05$) ash percentage compared to all other treatments, which were did not differ from each other ($P > 0.05$).

Conclusion

Results from this study indicated that the dietary inputs fed to cattle influence the physiochemical composition of beef. Although enhancement of beef has the potential to reduce slice shear force values and increase ultimate pH, it had no impact on cooked composition of beef.