

Does Supplemental Fat Affect Quality and Palatability of Beef from Steers Fed Barley-Potato Product Finishing Diets?

Darla J. Marks*, M. L. Nelson, and J. R. Busboom,
Washington State University, Department Animal Sciences, Pullman, Washington

Supplemental fat in barley-based finishing diets slows the rate of digestion, decreases fiber digestion, and methane emission, which results in improved feed efficiency and live weight gain. However, effects of dietary fat on appearance, quality, and shelf life of beef are not known. Therefore, the objective of this study was to evaluate the effects of supplemental fat in barley-potato product finishing diets on appearance, eating quality, palatability and shelf life of beef.

One hundred sixty-eight crossbred steers (317 ± 2.6 kg) were blocked by weight and randomly assigned to a $2 \times 3 + 1$ factorial complete block design with 3 initial weight blocks and fed for an average of 165 days. The main effects were level of yellow grease (0, 3, and 6%), and level of alfalfa hay (3.5 and 7%) with the added treatment of 6% tallow and 7% alfalfa hay. All diets contained 7% supplement with the remainder as steam rolled baroness barley. Carcass characteristics were measured on all steers. Longissimus muscle cuts from four randomly selected steers per pen were used for evaluation by an eight member trained sensory panel, a four person shelf-life panel, and for purge, cook loss and miniscan L^* , a^* and b^* color values. The level of yellow grease in the diet increased linearly ($P < .01$) hot carcass weight (343.4 to 357.0 ± 3.2 kg) and KPH (2.1 to $2.4 \pm .1$ %), but decreased linearly ($P < .05$) beef firmness from 3.0 to $2.7 \pm .1$ on a scale of 1(very soft) to 5(very firm) and fat luster score from 3.1 to $2.8 \pm .1$ on a scale of 1(very dull) to 5(very shiny). There was no effect of forage, but it did interact ($P < .05$) with level of yellow grease on back fat, marbling, percent choice and beef color score. Alfalfa at 3.5% increased backfat. Marbling was maximized at 3.5% alfalfa and 3% grease, while minimized with 7% alfalfa and 3% grease. Beef color score was mirror image to marbling. The tallow diet resulted in lower percent choice (21 vs $43 \pm 7.7\%$), and lower marbling scores (272 vs 295 ± 5.5 , where 300 =small) than the yellow grease diet. Diet didn't affect drip ($3 \pm .1\%$) or cook loss ($28.8 \pm 2.5\%$). Initial tenderness was increased quadratically ($P < .10$) by yellow grease from 7.2 to 7.6 to $7.4 \pm .1$ (where 10 was extremely tender), and decreased ($P < .10$) by alfalfa level in evaluation by the trained laboratory panel. Diet did not affect initial juiciness ($6.9 \pm .1$), sustained juiciness ($5.6 \pm .2$), or beef flavor ($5.3 \pm .1$). There was an interaction of yellow grease by alfalfa detected for off flavor ($P < .05$) by the laboratory panel, however all scores were less than $.5$ on a 10 centimeter line and therefore was deemed biologically not important. There were small non-biologically significant effects of diet on pH, wholesale purge ($.5 \pm .1\%$), and on shelf life measurements of color, retail purge, and L^* , a^* and b^* values.

Yellow grease in finishing steer diets increased carcass fatness and initial tenderness without affecting moisture losses or shelf life. Steers fed tallow had lower marbling score and percentage choice than steers fed yellow grease.

Keywords: Barley, Beef, Palatability, Tallow, Yellow Grease