

COMPARISON OF WINTER COW FEEDING STRATEGIES ON OFFSPRING CARCASS CHARACTERISTICS AND MEAT QUALITY

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I. OBJECTIVES

The objective of this study was to investigate the effects of maternal prepartum dietary energy source (forage vs. concentrate) during mid and late gestation on offspring carcass characteristics and meat quality.

II. MATERIALS AND METHODS

Angus × Simmental crossbred cows from a single source were stratified by body weight and age into 2 groups, transported to a drylot, and randomly assigned to one of 2 treatments ($n=48$ /treatment): Concentrate (dams provided a limit-fed concentrate-based diet) or Forage (dams provided an ad libitum forage-based diet). Treatment diets were isocaloric and isonitrogenous. Offspring from both treatments were weaned and transported to the Cow Calf Education and Research Facility in Brookings, South Dakota, where they received a finishing ration common to feedlots in the Upper Midwest. Ultrasound fat thickness and intramuscular fat percentage were estimated and used to project marketing dates. Carcass measurements were recorded at the time of harvest and included hot carcass weight (HCW), 12th rib backfat (BF), ribeye area (REA), USDA Yield grade and Quality grade, marbling score, and instrumental color measurements (L^* , a^* , and b^*). A striploin was collected from each carcass and portioned into 2.54-cm steaks. Four steaks were aged 3, 7, 14, or 21 d for Warner-Bratzler Shear Force (WBSF) analysis. Additional steaks were designated for Fatty Acid Methyl Ether Synthesis, determination of crude fat, and trained sensory panel evaluation of 14-d aged samples. Statistical analyses were conducted using generalized linear mixed model procedures (SAS GLIMMIX, SAS Inst. Inc., Cary, NC) for effects of treatment, sex, and their interaction. WBSF were analyzed for effects of treatment, sex, aging period (AP), and their interaction, with AP considered as a repeated measure and peak cooking temperature included as a covariate. Separation of least-squares means was conducted using protected least significant difference assuming an alpha level of 0.05.

III. RESULTS

No treatment × sex interactions ($P > 0.05$) were detected for carcass or meat quality traits. Additionally, maternal treatment did not influence ($P > 0.05$) offspring HCW, REA, Quality grade, marbling score, L^* values, WBSF, crude fat content of steaks, or trained sensory ratings. Offspring from the concentrate treatment had increased ($P < 0.05$) a^* (2.65%) and b^* (4.02%) values and tended to have increased ($P = 0.06$) BF (6.56%) and ($P = 0.08$) Yield grade (6.67%), compared with offspring from the forage treatment. The concentration (mg/g) of arachidonic, nervonic, and docosapentaenoic acids were increased in samples from the concentrate treatment ($P < 0.05$); treatment did not influence ($P > 0.05$) concentration of other fatty acids. Steers had heavier ($P < 0.05$) HCW and larger ($P < 0.05$) REA than heifers. Heifers had increased ($P < 0.05$) BF and marbling scores, as well as increased ($P < 0.05$) a^* and b^* values, percent moisture, and crude fat content than steers.

Tenderness improved ($P < 0.05$) with AP; however, there was a tendency ($P = 0.08$) for a sex \times AP interaction for WBSF. WBSF of heifers did not differ ($P = 0.79$) from steers at day 3 but were more tender ($P = 0.08$) at day 7, 14, and 21.

IV. CONCLUSION

Collectively, these data suggest that a forage-based diet provided to cows during mid and late gestation programmed offspring to decrease deposition of subcutaneous fat without compromising marbling score, tenderness, or other sensory attributes.

Keywords: beef, carcass characteristics, concentrate, forage, meat quality