



Influence of Maternal Corn Supplementation of Beef Cattle on Muscle Fiber Type and Meat Quality of their Offspring

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Objectives

To determine the influence of corn supplementation of beef cows during winter and their impact on offspring beef quality attributes.

Materials and Methods

Forty-seven multiparous Angus beef cows carrying male calves were assigned randomly to two dietary treatments: corn supplementation at 0.2% BW (SUP; $n = 24$) vs. non-supplementation (NSUP; $n = 23$) at d 110 d of gestation for 22 wks. *Ad-libitum* access to low-quality forage was provided to both groups. At 7 d post-calving, a muscle biopsy was collected from the *longissimus dorsi* muscle (LD) of each calf for muscle fiber typing. Offspring were managed as a single group from nursing through to the backgrounding phase. Thereafter, the steers were placed in the feedlot and assigned to 4 pens (blocks) based on BW and offered *ad-libitum* access to a 100% corn silage-based ration (76.97% TDN, 11.07% CP), salt and minerals. When the steers reached a final BW of 615 kg (~16 mo of age), they were slaughtered in a commercial abattoir. A second LD muscle biopsy sample was obtained at 45 min postmortem (PM) for muscle

fiber typing. At 96 h PM, striploins ($n = 42$) were collected, aged for 14 d and samples obtained for Warner Bratzler shear force (WBSF), proximal composition, myofibril fragmentation index (MFI), collagen analysis and objective color evaluation. Data were analyzed as a randomized block design.

Results

Immunofluorescent analysis for the myosin heavy chain (MHC) isoform on the proportion of the fiber type or fiber dimensions was not influenced by maternal dietary treatment at both ages ($P > 0.05$). However, regardless of maternal dietary treatment, the proportion of fiber type IIA decreased while type IIAX increased in samples from steers at 16 mo of age compared with samples from steers at 7 d of age. No differences were observed between dietary treatment groups in proximate composition ($P = 0.8$), MFI ($P = 0.29$), or collagen content ($P = 0.98$); however, WBSF values tended to be higher in steers from SUP cows than steers from NSUP dams ($P = 0.07$). Maternal dietary treatment had no influence on objective color evaluation at the retail display ($P > 0.05$). Objectives traits were not affected by dietary treatment \times display time interaction ($P = 0.92$).

Conclusion

Our findings indicate that corn supplementation of cows during mid to late gestation has minimal effects

on muscle fiber type and beef quality of their offspring. Thus, corn supplementation of low-quality forage offered during mid to late gestation did not have detrimental effects on muscle fibers and meat quality of offspring.