

72 Comparing three types of beef feedlot facilities and their effect on meat quality. T. J. Machado* and D. M. Wulf, *South Dakota State University, Brookings.*

The objective of this study was to determine the effects of three beef feedlot facilities on meat quality. Steers were housed at a feedlot in southeast South Dakota which had three pen designs, Open, Shed and Confined with a capacity of 80 head per pen. The Open pen design had no covering, concrete bunk aprons (4.3 m) and earthen pen floors with mounds (2 m high) allowing 25.5 m²/head with 2.8 m²/head mound space. The Shed pen design had a monoslope shed covering the feed alley and 6 m of pen, with 10 m of concrete (4 m uncovered), and 20 m²/head of earthen floor with 1 m high mounds. The Confined pen design was completely covered by a monoslope building, 4.3 m²/head of concrete floor that had 1.1 m²/head of deep pack bedding area in back of pen. Two hundred and forty steers of British genetics were divided into three pens, one pen per facility design with 80 head/pen. Steers were managed similarly between pens, on feed for 171 days, and harvested in one group when visual fat thickness was 1.3 cm. Carcass traits were collected on all 240 carcasses. Muscle pH, 7 and 14 d Warner-Bratzler shear force (WBS), glycolytic potential, and trained sensory panel data were evaluated on a random sub-sample of 40 carcasses per facility. Carcasses from Shed steers had less marbling (Slight⁹⁴) ($P = 0.004$) than Open (Small³³) and Confined (Small³⁴). There were no differences ($P > 0.05$) for Hot Carcass Weight (Open 380 kg, Shed 378 kg and Confined 378 kg), adjusted fat thickness (Open 1.30 cm, Shed 1.34 cm and Confined 1.42 cm), Kidney, Pelvic, Heart fat (Open 2.55 %, Shed 2.46 % and Confined 2.54 %), and ribeye area (Open 86.52 cm², Shed 86.26 cm² and Confined 88.39 cm²). Shed steers had a redder lean color ($a^* = 21.5$) than Open ($a^* = 21.2$) or Confined ($a^* = 21.1$) ($P = 0.0006$), and higher b^* values than Open (7.1 vs. 6.9) ($P = 0.0189$). L^* were similar ($P > 0.05$) for Open (40.7), Shed (41.0) and Confined (41.3). There were no differences ($P > 0.05$) between facilities for pH (Open 5.44, Shed 5.44 and Confined 5.40), WBS (Open 3.59 kg, Shed 3.81 kg and Confined 3.61 kg), and glycolytic potential (Open 143.0 $\mu\text{mol/g}$, Shed 138.7 $\mu\text{mol/g}$ and Confined 140.2 $\mu\text{mol/g}$). A nine-member trained sensory panel evaluated tenderness, juiciness, flavor intensity, and flavor desirability using 8-point descriptive scales. The Shed facility resulted in the juiciest steaks (5.39 vs. 5.24 for Open and 5.10 for Confined) ($P = 0.01$). There were no differences ($P > 0.05$) for tenderness (Open 5.30, Shed 5.41 and Confined 5.27), flavor intensity (Open 5.50, Shed 5.60 and Confined 5.52), or flavor desirability (Open 5.40, Shed 5.47 and Confined 5.26). In this study, housing facilities had minimal effects on meat quality, but beef produced in the Shed design had less marbling and redder lean and was juicier than beef produced in the Open or Confined facilities.