

Effects of liver abscess severity and quality grade on meat tenderness and sensory attributes in commercially finished beef cattle fed without tylosin phosphate

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Introduction

The objective of this study was to determine the effects of liver abscess severity in beef cattle at slaughter on meat tenderness and sensory attributes of steaks from USDA Low Choice and Select quality grades. Liver abscesses at the time of slaughter have been shown to decrease hot carcass weight, dressing percentage, yield grade, and marbling scores. However, little research has focused on the effects of animal health and disease parameters, including liver abscesses, on meat tenderness and sensory attributes.

Materials and Methods

Strip loin steaks (n = 119) were used to evaluate the effects of liver abscess severity and USDA quality grade on meat tenderness and sensory attributes of steaks from finished feedlot cattle. Steaks were used in a 3 × 2 factorial treatment structure using a completely randomized design and were collected at a commercial abattoir located in north-west Texas. All cattle were sourced from a single feedlot and fed a common diet that did not include tylosin phosphate. Treatments were USDA quality grades of Select (S) and Low Choice (C) and liver abscess scores of normal (N; healthy liver with no abscesses), mild (M; 1 abscess less than 2 cm in diameter to 4 abscesses less than 4 cm in diameter), and severe (SV; 1 abscess greater than 4 cm in diameter or greater than 4 small abscesses). All steak samples were collected on the same day and were cut from the left side of the carcass at the 13th-rib by a trained abattoir employee. Steaks were vacuum-packaged, and aged at 3 ± 1° C for 14-d post-mortem. Warner-Bratzler Shear Force (WBSF) and Slice Shear Force

(SSF) analyses were conducted and cook-loss percentage was measured. A trained sensory panel analyzed samples for juiciness, tenderness, and flavor attributes.

Results

There were no differences among liver abscess scores for WBSF or SSF (P > 0.52). Warner-Bratzler Shear Force was lower for C-SV than S-SV (P = 0.04). Sensory attributes of initial and sustained juiciness, and overall tenderness were all greater for C than for S steaks (P < 0.04) and connective tissue amount was less for C steaks when compared to S (P = 0.03). Liver abscess score had no effect on any sensory attributes (P > 0.70); however, there was an interaction between quality grade and liver score for myofibrillar tenderness (P = 0.03). Within C steaks, liver abscess score had no effect on myofibrillar tenderness (P > 0.05), however, in S steaks, M steaks were more tender than SV steaks (P < 0.03).

Significance

These results indicate that within quality grades, meat tenderness or sensory attributes were not influenced by liver abscess score but M liver abscesses may affect the myofibrillar tenderness of S steaks. Although there were no differences in meat tenderness due to liver abscess score at slaughter, liver abscesses still have a significant impact on margins in the beef industry due to decreased feedlot performance, hot carcass weight, and marbling. Research on liver abscess prevention without the aid of antimicrobials is still warranted.