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Meat and Muscle Biology™



Frequencies and Severity of Injection-Site Lesions in Muscles from Rounds of Cow Carcasses

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Objectives

The National Market Cow and Bull Beef Quality Audit (NMCBBQA) has been conducted 4 times: 1994, 1999, 2007, and 2016. Following the original audit attention was drawn to injection-site lesions and the need to further assess the frequency and severity. The 2016 audit reported a major decline in presence of surface knots or injection-site lesions compared with previous audits. The presence of lesions was discussed in detail at the strategy workshop held as the third phase of the 2016 NMCBBQA. Further processors expressed extreme concern of loss and the need to once again evaluate lesions as they had been evaluated in 1998, 1999, and 2000. Therefore, the objective of this study was to evaluate the frequency and presence of injection-site lesions in the outside round muscles of cows.

Materials and Methods

Audits were conducted in 2017 on 1300 rounds from dairy and beef cows. Audits were conducted in 7 locations throughout the U.S. Outside round muscles were butterfly cut into 1.25-cm slices and if present lesions were counted, measured and categorized. The outside round consisted of 4 quadrants: Q1 identified as the most caudal end, closest to the shank, while Q4 identified as the most cranial end, included the *biceps femoris* muscle. Q2 and Q3 were evenly split between Q1 and Q4. Q1, Q2, and Q3 included both muscles. The depth of each lesion was measured from the outside surface (fat trimmed) to the innermost (center) of the lesion. The diameter was measured using the lengths of the lesion throughout the muscles. The lesions were classified using the 5-point system: classification 1: clear, lesion contains primarily clear connective

tissue; classification 2: woody, lesion contains organized connective tissue and fat; classification 3: nodular, lesion contains nodules, a central foci, and granulomatous inflammation; classification 4: metallic, lesion contains mineralized remnants of muscle cells, typically bloody color; or classification 5: cystic, lesion contains fluid.

Results

Of the beef and dairy rounds evaluated 7 and 15%, respectively, had injection-site lesion(s) present. These frequencies were significantly decreased in 2017 from the 2000 audit where beef rounds were 13% points higher and dairy rounds were 20% points higher. The decline was even more significant from the 1998 audit where beef rounds were 24% points higher and dairy rounds were 45% points higher. The most common location of injection-site lesions was quadrant 2 and 3, which contained both the *biceps femoris* and *semitendinosus* muscles. Injection-site lesions were more frequent ($P < 0.05$) in the *biceps femoris* for both beef and dairy rounds. Clear and metallic lesions were the most common. Clear lesions accounted for 57% of injection-sites in both beef and dairy rounds while metallic lesions made up 23% of the total in beef and 25% in dairy.

Conclusion

Overall, there was a dramatic decline in the frequency ($P < 0.05$) of injection-site lesions since the 1998, 1999, and 2000 audits. Educational programs, such as Beef Quality Assurance, have increased improvements in management practices for both the beef and dairy industries