

Cattle Producer's Handbook

Quality Assurance Section

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The Cattle Producer's Role in Beef Quality Assurance

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Beef consumers have become more health conscious and are concerned about the relationship between red meat diets and diseases of over-consumption. There is uneasiness over potential drug and chemical residue contamination of beef products. Also, there is the perception that using antibiotics in food animals might be responsible for increased antibiotic resistance in microbes associated with food borne illness in humans. These concerns and perceptions for the safety of beef products have sparked industry leaders to find ways to address public regard for beef product quality.

Beef quality assurance programs today aim at many quality issues including drug and chemical residue avoidance, reduction of injection-site damage, reduction of tissue damage from bruises, and excessive fat trim. Several quality deficits in marketed mature cows and bulls such as advanced lameness, inadequate muscling in cows, heavy live-weights in bulls, and low dressing percentages are also included.

The newest efforts toward overall quality and wholesomeness of meat products has been directed at reducing the number of bacteria on finished carcasses that cause human illness. These efforts have been sparked by outbreaks of food borne illness involving specific human pathogens found in hamburger and other meat products (e.g., *E. coli* 0157:H7).

At present, reduction and control steps are regulated by federal law at processing plants throughout the country. In the near future, the beef industry will be called on to reduce and/or control specific pathogens in animals at production facilities, such as feedlot, backgrounding, and cow-calf operations. Currently, methods for pathogen reduction at beef production centers are not well developed or are theoretical.

Cow-Calf Producers and Quality Assurance

First, one must be convinced of the need for strengthening and sustaining quality in beef products. From consumer surveys we learn that 83 percent believe that food safety is an important issue. Food safety concerns were ranked right with the importance of crime prevention and safe drinking water.

Further, 81 percent take as being accurate most or all of the information they get from the media regarding food safety issues. Therefore, they may react to both good and bad information about beef. Issues that are of greatest concern to our consumer clients are bacteria in food (85 percent), food handling and preparation (82 percent each), pesticide residue (78 percent), drug residue (75 percent), and hormones in food (67 percent).

The competition from poultry and swine products for market shares of meat sales is strong. If the market share of red meat is to remain competitive, the industry must establish and maintain high quality standards for their product. Decreased public confidence in red meat products causes reduced consumption, the cost for which trickles back along the production chain until it comes to rest at the producer's gate.

Ultimately, producers share the responsibility to assure the public that high standards of quality and wholesomeness are being met. Every producer must realize they are producing an animal destined for human consumption.

Drug and Chemical Residue Avoidance

Violative residue avoidance is the main focus in quality assurance programs for all food-animal species. For most of the fed cattle sent to slaughter, contamination

from drug or chemical residues may be a moot issue as the annual incidence of violative residues in that group remains at or near zero. However, the incidence of violative residues in young slaughtered calves and slaughtered cows continues to be problematic for the industry. Evidence of human illness resulting from drug residues in meat is scant, and some existing reports may be equivocal. Be that as it may, both public and physician perceptions continue of human illness caused by drug or chemical residues in meat and milk.

Producers have the opportunity to be proactive on this issue by observing good practices of drug use that include identification of treated animals and observing established withdrawal times. Producers are encouraged to reassess their drug uses and choices in efforts to assure that they are in line with current state and federal regulations. Consult with your veterinarian for advice on this issue.

Of course, the first step in avoiding drug residues is to prevent those diseases that require use of antibiotics or other drugs. Disease prevention, and your veterinarian's role in advising for it, are vital parts of a quality assurance program.

Recommended guidelines to minimize the risk from a violative drug residue at slaughter:

- Follow label directions for dosage and administration.
- Never use products in an extra-label manner without a veterinary prescription.
- Use appropriately extended withdrawal times for any extra-label drug use.
- Identify and/or separate all treated animals.
- Keep records of animal identification, product name, dosage, and dates used.

Use of Drugs and Antibiotic Resistance

Recently, there has been a growing concern, worldwide, over increased numbers of antibiotic-resistant strains of bacteria that are emerging. Some of these strains are commonly found in cattle, such as *Salmonella typhimurium* DT104, which is usually resistant to five or more antibiotics at the same time. Once these antibiotic-resistant bacteria are established in a herd, the possibilities for them to spread to humans are numerous. The methods of antibiotic resistance formation are complex, however, exposure to antibiotics will eventually allow resistance to develop in a population of bacteria.

Producers and veterinarians alike need to be aware of the potential for emerging resistance of the bacteria in a cattle herd, especially those that cause illness in humans. Generally, the recommendations for antibiotic residue avoidance will reduce some of the risk of emerging resistant strains of bacteria.

Drug/Antibiotic Usage Recommendations

1. Preventive strategies, such as proper management,

hygiene, adequate nutrition, and vaccination, should be emphasized in preference to antibiotic use.

2. Use antibiotics only for conditions that have been diagnosed as needing an antibiotic treatment for cure or improvement.
3. Avoid using antibiotics in feed or water except when your veterinarian has made the recommendation for treatment or prevention of a known illness.
4. Follow exact dosage on the label or as prescribed by your veterinarian.
5. When you must use antibiotics, do so for the shortest time that is only as long as necessary to affect the clinical problem.

Injection Site Tissue Damage

Research has shown that when certain products are injected into or near muscle tissue, they produce damage at the site and surrounding tissue. They may cause abscesses in the short term and most cause a meat toughening blemish in the long term. These blemishes are not always visible, but the consumer can tell the meat is tough when they bite through it.

Fig. 1 shows common injectable products known to cause muscle damage +200 days after injection. Products include certain clostridia bacterins, oil-based virus-vaccines and bacterins, macrolide antibiotics, long-lasting oxytetracycline, injectable vitamin, and injectable mineral products. In one study, even 10 ml of sterile saline caused measurable muscle damage detectable after 200 days.

Increased toughness has been shown to extend up to 64 cubic inches beyond the outer margins of the injection site (Fig. 2). Thus, a piece of meat the size of 4 x 4 x 4 inches may become tough.

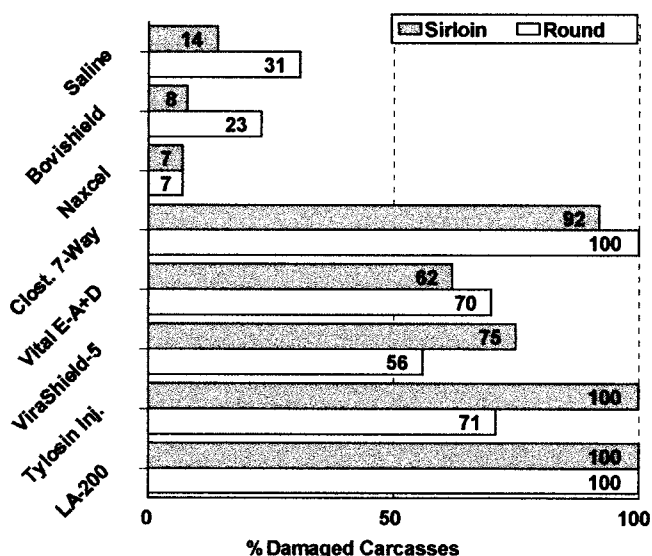


Fig. 1. Percent of carcasses with injection-site damage 200+ days after being given an intramuscular injection with one of the products at weaning.

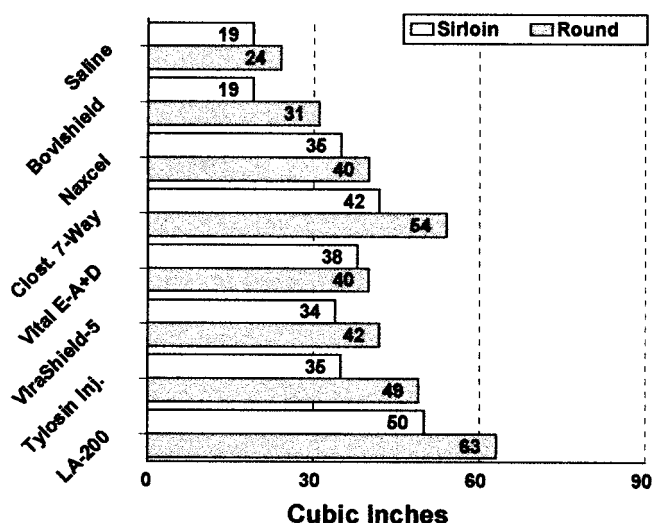


Fig. 2. Average volume, in cubic inches, of tough steak found around injection sites 200+ days after being injected.

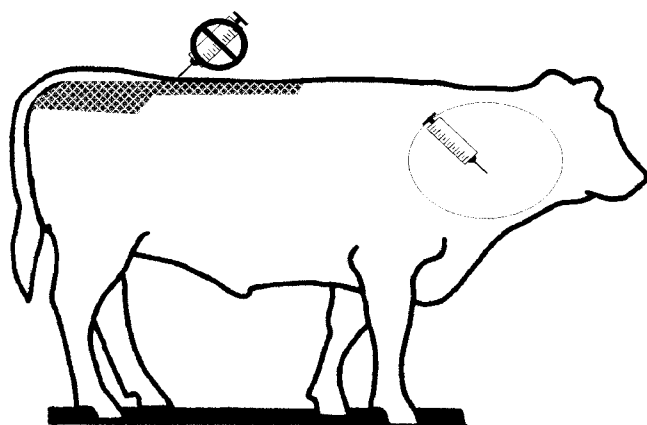


Fig. 3. Preferred injection-site location is in front of the shoulder in the neck muscles.

Injection-site blemishes have been detected in 7.5 percent of carcasses hanging at processing plants. It required an average of 6 ounces of meat to be trimmed out around the blemish. The loss from injection-site blemishes is more than 1.2 million pounds of wasted meat with a retail value of more than \$3 million.

Producers should be aware of potential adverse reactions that result from administration of intramuscular products. Intramuscular (I.M.) injection of vaccines caused a severe reaction that resulted in spinal cord compression and paralysis in 14 percent of a group of 3- to 5-month-old dairy heifers.

Questioning of the owner revealed that all 50 heifers in this group had been vaccinated in the neck muscle 15 days before the onset of clinical signs. Each calf received three different oil adjuvanted bacterins totaling nine cc's of vaccine products. This case demonstrates the risk of losing individual animals if a large volume of an irritating solution is administered too close to the spinal cord.

Producers are encouraged to choose a subcutaneous (SubQ) injection route in place of an intramuscular route of treatment for all injectable products, whenever the product-label allows. Place all injections (SubQ and I.M.) in front of the shoulder in the neck muscles. Avoid injecting into the loin and top-butt areas (Fig. 3).

Recommendations to Avoid Injection Damage

The following are recommendations from beef quality assurance programs that should reduce the injection-site blemishes in high-value cuts of meat. Apply these guidelines to animals of all ages:

1. Place all injectable products in the area in front of the shoulders.
2. Administer injectable products by the subcutaneous route whenever the product label allows.
3. If an intramuscular product is required, place injection into muscles in front of the shoulder region only.
4. Use sharp, sanitary needles, between 16 and 18 gauge, and 1 to 1 1/2 inches long, for all intramuscular injections.
5. For adult animals, inject no more than 10 ml of product per site and separate injection sites by at least 4 inches. For calves and lightweight cattle, reduce the volume of product per site and keep sites separate.
6. Change needles often (e.g., every 10 to 15 animals or whenever the syringe needs to be refilled).
7. Avoid giving injections when animals are wet and/or injection sites are covered with dirt, mud, manure, or other potential contaminating material.

Damage from Bruising

Quality assurance audits have addressed the issue of bruising. Reports list tissue damage from bruises as a quality concern in feeder cattle and non-fed cattle as well. Depending on the severity of the original injury, damaged muscle may be unhealed at time of slaughter resulting in a significant lesion requiring cut out and removal of 3 to 4 pounds of damaged meat at each site.

A recent survey revealed 52 and 25 percent of mature cows and bulls presented for slaughter had major bruises, 54 and 19.5 percent of cows and bulls had medium bruises, and 31 percent of cows and 7.4 percent of bulls had minor bruises. The total loss from bruised tissue cut out was approximately \$61 million in retail sales for 27 million pounds of meat product (Fig. 4).

In addition to the obvious quality issue involved with bruised tissue, there may be an animal well-being concern as well. Rough handling of cattle, particularly during procedures requiring the use of a squeeze chute and head catch, is likely to escalate the incidence of severe bruising of the shoulder muscles.

Leading the way in the effort to reduce the incidence of carcass bruises, an increasing number of feedlot em-

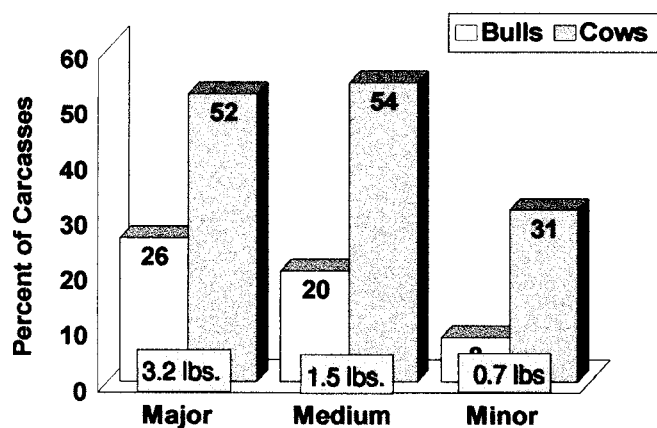


Fig. 4. Percent of major, medium, and minor bruises in bull and cow carcasses. Average pound loss per bruise type is shown in boxes in front of bars.

ployees are being persuaded by managers and veterinarians alike to place emphasis on maintaining a quality carcass in place of processing speed records. Reduction of injection-site lesions, bruised carcasses, and drug residues are part of their quality assurance program.

Recommendations to Minimize Bruises

Recommendations for reduction of bruised carcass damage include:

1. Use good management practices when moving cattle into and/or through restricted passageways.
2. Control animal movement into and through squeeze chutes in a manner that minimizes body collisions with head catch gates and/or tail gates.

3. Remove or cover sharp objects and edges in alleyways, chutes, gate openings, and other areas used for cattle passage.
4. Remove or tip horns on cattle to minimize bruising from purposeful or accidental butting.
5. Encourage safe transportation methods that minimize rough handling.

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Fourth edition; December 2016 Reprint