



BEEF CATTLE RESEARCH UPDATE

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September 2009

Safety of Beef from Organically and Naturally Raised Cattle

A recent Kansas State University review stated that niche-marketed food products are rapidly gaining market share in today's society partially because consumers perceive that these niche markets provide healthier and safer food products.^{1,2} This review also states that the two main niches for food animal production are organic and natural productions. Organic beef production, regulated by the USDA's National Organic Program³, requires feeding with certified organic feed and raising cattle without the use of antibiotics (especially those provided in the feed or water for growth promotion or disease prevention) and growth-promoting hormones. In contrast, natural beef programs are largely defined and regulated by the company that owns the brand rather than the U.S. Department of Agriculture.⁴ Natural production guidelines often include a complete restriction on the use of antibiotics and growth-promoting hormones, but unlike guidelines for organic production, they allow feed from nonorganic sources.

This review noted that the impacts of these production systems (organic and natural) on foodborne pathogens in beef cattle are variable and often data are nonexistent. It was reported that studies directly comparing conventional and niche-market production systems for dairy, swine, poultry, and produce have observed that the prevalence of foodborne pathogens was seldom statistically different between production systems, but when differences were observed, prevalence was typically greater for the niche-market production systems than the conventional production system. This literature review suggests that the perception of niche-marketed food products being safer and healthier for consumers with regard to foodborne pathogens may not be justified.

An additional Kansas State University study determined the prevalence of *Escherichia coli* O157:H7 in the feces of organically and naturally raised beef cattle at slaughter and compared the antibiotic susceptibilities of isolates from organically, naturally, and conventionally raised beef cattle.⁵ These researchers included cattle in this study from three types of production systems: organic, natural, and conventional. Organically raised beef cattle were from farms that were certified by the National Organic Program³ and the naturally raised beef cattle were from farms that were certified by the All Natural Source Verified Beef Program³. Samples from conventionally raised cattle came from two feedlots.

This research reported that the prevalence of *E. coli* was 14.8 and 14.2% in organically and naturally raised cattle, respectively. It was noted that these prevalence rates are similar to those reported previously for conventionally raised feedlot cattle. These researchers also reported that there were no major differences in antibiotic susceptibility patterns among the isolates from the three types of production systems. In summary, these two recent Kansas studies suggest that organically or naturally raised beef is no safer than conventionally raised beef.

Relationship of Various Incoming Cattle Traits with Feedlot Performance and Carcass Traits

A recent study analyzed data collected on 15,631 steers and 5,897 heifers fed at 18 feedlots in southwest Iowa between 2002 and 2006 as a part of the Tri-County Steer Carcass Futurity sponsored by Iowa State University.⁶ This study evaluated the relationship between various incoming cattle traits and feedlot performance and carcass traits. The incoming cattle traits that were evaluated included: initial body weight, disposition score (1 = calm, 6 = extremely excitable), muscle score, frame score, body condition score, number of treatments for respiratory disease, presence of lung lesions, breed makeup, and percentage Angus genetics. Some of the major findings from this study are summarized below.

- Disposition score: Cattle with greater disposition score (more excitable) had decreased initial weights, final weights, daily gains, carcass weights, USDA yield grades, quality grades, marbling scores, and mortality when compared to calmer cattle.
- Initial weight: As initial weight increased, final weight and carcass weight increased and respiratory morbidity decreased
- Body condition score (BCS): Cattle with greater BCS on arrival had greater initial weights but were lighter at slaughter.
- Respiratory disease treatment: As the number of treatments increased, daily gain decreased while mortality (death loss) and the incidence of lung lesions increased.
- Breed type: Weight gain was similar between English- and Continental-breed cattle. However, final weights and carcass weights were greater and yield grade and yield grade-adjusted marbling score were less for Continental-breed cattle than English breed cattle.
- Muscling score: Cattle with a poorer muscling score yielded lighter carcasses with smaller ribeyes, greater yield grade, marbling score, and quality grade.
- Respiratory sickness: Morbidity was negatively correlated with initial weight, daily gain, yield grade, carcass weight, and marbling score.

These researchers concluded that animal disposition, health, breed type, and frame score have dramatic effects on live feedlot performance and carcass traits.

¹ Fox, J. T., S. Reinstein, M. E. Jacob, and T. G. Nagaraja. 2008. Niche marketing production practices for beef cattle in the united states and prevalence of foodborne pathogens. *Foodborne Pathog. Dis.* 5: 559-569.

² Jacob, M. E., J. T. Fox, S. L. Reinstein, and T. G. Nagaraja. 2008. Antimicrobial susceptibility of foodborne pathogens in organic or natural production systems: An overview. *Foodborne Pathog. Dis.* 5: 721-730.

³ Agricultural Marketing Service/United States Department of Agriculture. The national organic program. Available at: <http://www.ams.usda.gov/AMSV1.0/nop>.

⁴ Troxel, T. R. Natural and organic beef. University of Arkansas Cooperative Extension Service: FSA3103. Available at: http://www.uaex.edu/Other_Areas/publications/PDF/FSA-3103.pdf

⁵ Reinstein, S., J. T. Fox, X. Shi, M. J. Alam, D. G. Renter, and T. G. Nagaraja. 2009. Prevalence of *Escherichia coli* O157:H7 in organically and naturally raised beef cattle. *Appl. Environ. Microbiol.* 75: 5421-5423.

⁶ Reinhardt, C. D., W. D. Busby, and L. R. Corah. 2009. Relationship of various incoming cattle traits with feedlot performance and carcass traits. *J. Anim. Sci.* 87: 3030-3042.

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