

BEEF INDUSTRY SAFETY SUMMIT

March 3-5, 2015

Dallas, TX

Project Title: Investigation into possible breed differences in *Salmonella* prevalence in the peripheral lymph nodes of cattle

Presenter: Tyson R. Brown, Tom S. Edrington, Guy H. Loneragan, Devin L. Hanson, Katelyn Malin, Josh J. Ison, and David J. Nisbet
Presenters email address: tyson.brown@ars.usda.gov
Mailing address: USDA-ARS, Food and Feed Safety Research Unit
2881 F&B Road
College Station, TX 77845

Category: Pre-harvest research

Published: Unpublished to date

Objective: Previous research demonstrated significant variation in the prevalence of *Salmonella* in peripheral lymph nodes (PLNs) of fed and cull cattle with greater prevalence in feedlot cattle. Lower PLN *Salmonella* prevalence in cull cattle may be a function of breed; age; immune function; or other management prior to harvest. If breed, then Holstein steers might be expected to have lower PLN prevalence than their native counterparts. Recent research in our laboratory has demonstrated a transdermal route of PLN infection implicating biting insects. Brahman cattle are reported to be more insect tolerant, therefore, a secondary objective compared Brahman cattle to their native counterparts within the same feedyard.

Experimental Design & Analysis:

For experiment I, sub-iliac PLNs were collected from fed Holstein and native (beef breeds) steers that originated from the same feedyards in the Southwestern United States and were harvested on the same day. For experiment II, sub-iliac PLNs were collected from fed Brahman (100% Brahman breeding) and native (non-dairy, beef breeds with limited Brahman influence) cattle that originated from the same feedyard in the Southwestern United States. Samples were placed on ice and shipped overnight to our laboratory for processing the next day.

Key Results:

Of the 467 Holstein and 462 native PLNs collected, 62.1% of Holstein and 59.7% of native samples harbored *Salmonella* ($P > 0.05$) with 51.2% and 48.9% of samples containing quantifiable concentrations ($P > 0.05$), respectively. The concentration of *Salmonella* within the PLN followed a decreasing trend over the collection period (May - October); averaging 1.3 CFU \log_{10}/g lymph node and 1.4 CFU \log_{10}/g lymph node for Holstein and native samples, respectively ($P > 0.05$). *Salmonella* concentrations were greater ($P < 0.05$) for Holstein samples in June and July (3.4 and 3.1 CFU \log_{10}/g), as compared to native (3.0 and 2.6 CFU \log_{10}/g). However, *Salmonella* concentrations were greater ($P < 0.05$) for native samples on a second June and August collection (2.1 and 2.1 CFU \log_{10}/g), as compared to Holstein (1.6 and 1.0 CFU \log_{10}/g), respectively. *Salmonella* was recovered from 62.1% of sub-iliac lymph nodes from Holstein and 59.7% of native samples ($P > 0.05$). *Salmonella* prevalence was greater ($P < 0.05$) for Holstein (42.7%) samples on the second August collection, as compared to native (18.0%). In the second experiment, of the 42 Brahman and 31 native cattle PLNs collected, 100% and 97% contained

quantifiable concentrations ($> 0.1 \log_{10}$ CFU/g) of *Salmonella* ($P > 0.05$), respectively. The concentration of *Salmonella* within the PLN averaged 3.0 CFU \log_{10} /g for Brahman and 2.9 CFU \log_{10} /g for native samples ($P > 0.05$). Using qualitative culture, we recovered *Salmonella* from 100% of PLNs from Brahman and 97% of native samples ($P > 0.05$).

Industry Application:

Results of this research indicate that the differences observed between cull and fed cattle are not a breed effect and likely a function of age, immune function, or other factors. Understanding which cattle are more likely to harbor *Salmonella* within PLNs will aid in targeting both pre- and post-harvest intervention strategies.