

Impact of *Escherichia coli* O157 prevalence on *Salmonella* prevalence in feedlot beef cattle

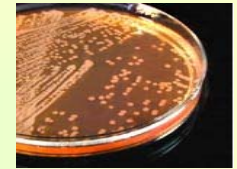


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Objective

To determine if a relationship exists between changing prevalence levels of *Escherichia coli* O157 and prevalence levels of *Salmonella* in feedlot beef cattle in response to the stress of shipping and lairage at the abattoir and to characterize patterns of change seen.

Project Justification

Finding a relationship may indicate shared requirements such as growth factors, or physiologic factors related to stress that both organisms take advantage of. Alternatively, a relationship may indicate a competitive inhibition between the two. Characterizing patterns of change may focus efforts at reducing on-animal contamination during shipping and lairage.

Methods

Pens were selected from feedlots in CO and NE. Up to 50 samples were collected from each pen: no more than 10 environmental samples (pen rails, floor, water, and truck), 20 hide samples, and 20 fecal samples. Hide samples were collected by swiping a moist sponge over the withers as the animals were loaded into the trucks. Fecal samples were collected from the pen immediately after the animals were loaded. At the abattoir, environmental and fecal samples were sampled from the lairage pen holding the same group of cattle and hide samples were taken immediately post-harvest. Samples were processed the same day of collection. Samples were then cultured for *E. coli* and *Salmonella*. Presumptive colonies were tested with latex agglutination tests for both organisms. *Salmonella* isolates identified in this manner were sent to the National Veterinary Services Laboratory in Ames, Iowa for confirmation and serotyping while *E. coli* positives were confirmed by PCR at the Colorado State Diagnostic Laboratory.

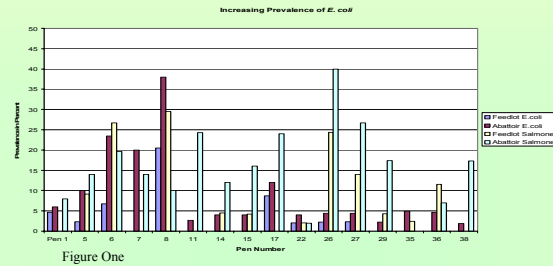


Figure One

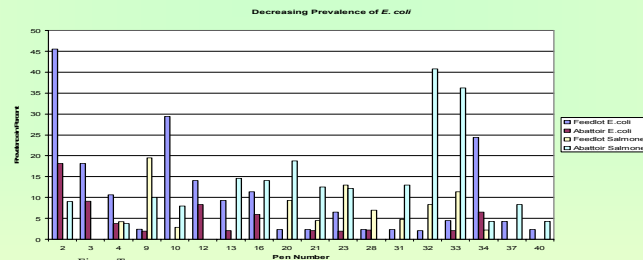


Figure Two

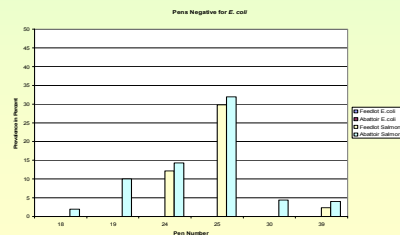


Figure Three

Results

At the feedlot, prevalence in each pen ranged from 0%-45.5% for *E. coli* while prevalence for *Salmonella* ranged from 0%-29.8% (median values 2.3% and 2.9% for *E. coli* and *Salmonella*, respectively; mean values were 6.09% and 6.60%). At the abattoir, *E. coli* prevalence ranged from 0%-38% and *Salmonella* prevalence ranged from 0%-40.8% (median 2.2% and 12%; mean 5.28% and 13.22% for *E. coli* and *Salmonella* respectively). *E. coli* increased in 16 of 40 pens; of those *Salmonella* increased in 11 pens, and decreased in 5 pens (Figure One). *E. coli* decreased in 18 of 40 pens; of those *Salmonella* increased in 12 pens, decreased in 4, and remained absent in 2 (Figure Two). *E. coli* was absent in 6 pens; all 6 saw an increase in *Salmonella* from feedlot to abattoir (Figure Three). *Salmonella* decreased between the feedlot and abattoir in only 9 of 40 pens and remained absent in 2 pens.

Conclusions

Neither an increase nor decrease in prevalence *E. coli* O157 was found to be predictive either an increase or decrease in prevalence of *Salmonella*. Over twice as many pens in increase in *Salmonella* when *E. coli* increased, however, three times as many pens an increase in *Salmonella* as *E. coli* decreased. This, coupled with the variable magnitude of change seen with both organisms, suggests that there is no simple relationship between the two organisms.

