

BEEF INDUSTRY SAFETY SUMMIT
March 1-3, 2016
Austin, TX

Project Title: Evaluation of Sodium Chlorate as a Pre-Harvest Intervention for Controlling *Salmonella* in the Peripheral Lymph Nodes of Cattle

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Category: Pre-Harvest

Published: Unpublished to date

Objective: Evaluate sodium chlorate as a potential pre-harvest intervention for reducing or eliminating *Salmonella* from the peripheral lymph nodes of experimentally-infected cattle.

Experimental Design & Analysis:

The peripheral lymph nodes of Holstein steers (approx. BW = 160 kg; 4 and 6 head in control and chlorate treatments, respectively) were experimentally inoculated with *Salmonella* Montevideo utilizing an intradermal technique developed in our laboratory. Steers were inoculated every other day for a total of three inoculation events. Sodium chlorate (42 mg/kg BW daily) was provided in the animal's daily grain ration for three successive days initiating on the final day of *Salmonella* inoculation. Six steers received chlorate and another 4 animals served as controls. Animals were euthanized and necropsied the day following the final chlorate administration and the peripheral lymph nodes (sub-iliac, pre-scapular and popliteal) removed and cultured quantitatively and qualitatively for *Salmonella*. Three isolates from each *Salmonella* positive sample were serogrouped using slide agglutination to confirm they matched the challenge strain (C₁). Data were analyzed using SAS software (version 9.2, SAS Institute Inc., Cary, NC). Quantitative (concentrations) and qualitative (prevalence) data were subjected to analysis using the PROC Mixed and PROC Freq procedures, respectively.

Key Results:

Salmonella concentrations were lower ($P = 0.03$) in the popliteal lymph nodes and when all nodes were collectively analyzed in the chlorate treated cattle compared to controls. At a minimum, a numerical decrease in concentration was noted in the nodes of chlorate treated cattle, when examined by individual node (right and left of each type) or when combined by type (popliteal, sub-iliac and pre-scapular) (Table 1). All lymph nodes were *Salmonella* positive following qualitative culture and all isolates were confirmed as serogroup C₁. Results suggest that chlorate reached the lymph nodes and reduced, albeit slightly, the concentrations of *Salmonella* within these nodes. Chlorate may have a more profound effect when *Salmonella* concentrations within these nodes are higher, such as has been reported in cattle at slaughter. Further research is underway to evaluate this potential.

How can this information can be applied in the industry?

Results of this research, while preliminary, suggest a potential effect of sodium chlorate on *Salmonella* in the peripheral lymph nodes of cattle. Further research will seek to confirm these results and determine if subsequent field studies are warranted.

Table 1. *Salmonella* concentrations (CFU log₁₀/g of lymph node) recovered from the peripheral lymph nodes of experimentally-infected cattle fed sodium chlorate (42 mg/kg BW daily) for three days prior to necropsy.

Node		Control	Chlorate	P value
Popliteal	right	1.45	1.05	0.24
	left	1.43	0.88	0.07
	both	1.44	0.97	0.03
Pre-scapular	right	1.18	1.07	0.82
	left	1.25	0.78	0.35
	both	1.21	0.93	0.37
Sub-iliac	right	1.83	1.42	0.4
	left	1.65	1.4	0.55
	both	1.74	1.41	0.26
All nodes		1.46	1.1	0.03