RESEARCH ABSTRACT

PORK SAFETY

Title: Effect of chlorate treatment on transmission of *Salmonella* in swine during lairage and transport. - **NPB #02-074**

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Abstract: Each year more than 1.3 million human cases of Salmonellosis are reported in the United States. Swine can be a reservoir of *Salmonella* that can be transmitted to human consumers of pork products. *Salmonella* have the ability to respire anaerobically by reducing nitrate to nitrite via the intracellular enzyme nitrate reductase (NR). However, NR does not differentiate between nitrate and its valence state analog chlorate, which can be converted within the bacterium to cytotoxic chlorite. When added to pure and mixed cultures of bacteria, chlorate killed both *E. coli* and *Salmonella* within 24 h. Preliminary in vivo studies indicated that chlorate supplementation reduced *E. coli* O157:H7, wild-type *E. coli* and *Salmonella* in cattle, sheep and swine, respectively. Therefore, an experimental chlorate-containing product (XCP) has been developed for use in food animals. The current study was undertaken to evaluate the effectiveness of XCP during the short-term lairage period immediately prior to harvest. Pig manure (10 kg) was inoculated with 10^3 CFU/g *Salmonella* Typhimurium and was spread throughout pens housing pigs (n=20) to simulate the introduction of swine to dirty lairage facilities. After 2 h, pigs were given *ad libitum* feed (controls) or feed supplemented with XCP (XCP) for 6 h. Animals were humanely sacrificed and tonsils, ileocecal lymph nodes, cecal and rectal contents were collected. Fewer pigs treated with XCP had *Salmonella*-positive tonsils, but not unexpectedly due to the continuous exposure to *Salmonella*-contaminated feces this difference was not significant ($P>0.05$). No differences were noted in lymph node or intestinal content *Salmonella* status, likely due to the very short duration of XCP treatment. However, in a follow-up study using pigs (n=20) naturally colonized with *Salmonella*, XCP treatment significantly ($P < 0.05$) reduced natural cecal *Salmonella* colonization. Thus, these results indicate that XCP could be a viable pre-harvest intervention strategy to reduce *Salmonella* concentrations in swine, however further research is needed to optimize the effectiveness of XCP during lairage and transport to the slaughter facility.