

## PORK SAFETY

**Title:** Effect of sodium chlorate on *Salmonella* Typhimurium in the pig gut  
**NPB #00-136**

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### Abstract:

*Salmonella* cause disease and compromise food safety. Consequently, strategies are sought to reduce their concentration in pigs immediately before processing. Respiratory nitrate reductase activity possessed by *Salmonella* coincidentally catalyzes the intracellular reduction of chlorate to chlorite, a consequence that kills the microbe. Since most beneficial gut bacteria lack respiratory nitrate reductase, we conducted several studies to see if chlorate may selectively kill *Salmonella*, but not beneficial microbes, within the pig gut. In the first study, weaned pigs orally infected with *Salmonella* Typhimurium were treated 8 and 16 h later via oral gavage (10 ml) with 0 or 100 mM sodium chlorate. The pigs were euthanized at 8 h intervals after receiving the last treatment and samples collected by necropsy were cultured for *Salmonella*. A significant chlorate treatment effect ( $P < 0.05$ ) on cecal *Salmonella* concentrations was observed, although a treatment x time after treatment interaction was also observed which suggests that the chlorate effect was concentration dependent. In follow up studies, 0, 15 or 30 mM sodium chlorate solutions were administered via drinking water to weaned or finished pigs experimentally challenged 24 h earlier with *Salmonella* Typhimurium. These pigs were euthanized 12 h or 24 h after being allowed ad libitum access to their respective treatments and gut samples were again cultured for the challenge *Salmonella* strain. In these studies, *Salmonella* concentrations in gut contents collected from chlorate treated pigs were reduced up to 1000-fold compared to concentrations from control pigs. These results demonstrate that chlorate administration may be a practical procedure for reducing gastrointestinal concentrations of *Salmonella* in pigs immediately prior to processing.

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