RESEARCH ABSTRACT

PUBLIC HEALTH/WORKER SAFETY

Title: Use of *Lactococcus lactis* as a probiotic feed additive against porcine postweaning enteric colibacillosis- **NPB #14-075**

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Abstract

Enteric colibacillosis, caused by Escherichia coli, is the most common bacterial disease of neonatal and post-weaning piglets. Neonatal colibacillosis is controlled to a certain degree by maternal colostral immunity. However, the control of postweaning colibacillosis is problematic in the modern swine industry. To ensure profitability, piglets are weaned at ~3 weeks of age (when their immune system is still weak). Consequently, postweaning diarrhea (PWD) caused by E. coli is a major health problem associated with high morbidity & mortality that is currently controlled in part by antibiotic feed additives. We previously demonstrated that *L. lactis* prevents attachment of F4 positive *E.coli* to enterocytes *in vitro*. Accordingly, objective of this project was to determine if *Lactococcus lactis* used as a probiotic feed additive can prevent E. coli infection (PWD) in weaned piglets.

To determine the ability of *Lactococcus lactis* to inhibit adherence of pathogenic *E. coli* and prevent diarrhea *in vivo*, we fist assessed the ability of ingested *Lactococcus lactis* to survive and colonize gastrointestinal tract of weaned piglets. The generated data demonstrate that ingested feed containing 10^{10} or 10^{11} CFU/kg of freeze-dried *Lactococcus lactis* is sufficient for effective intestinal colonization of weaned piglets. *Lactococcus lactis* was successfully isolated from fecal material and its identity was confirmed by bacterial culture, Western blot and PCR.

Experimental infection of recently weaned piglets demonstrated that gastrointestinal tract was successfully colonized by F4 positive *E.coli*. Bacteria were confirmed by bacterial culture, immunoprecipitation and PCR. The bacteria were quantified by Real Time PCR in piglets' fecal material. However, no clinical signs of diarrhea were reproduced during experimental infection.

Comparison of colonization by F4 positive *E.coli* of piglets exposed to *L. lactis* and control group indicated that both groups were susceptible to colonization by F4 positive *E. coli*. There was no statistically significant difference in amounts of *E. coli* in porcine feces between the groups of piglets during the whole period of the trial.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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