of the advised control measures on the Salmonella prevalence at the farm based on this research due to the limited number of farms. The adjusted HACCP methodology is useful to determine weak points and the control measures in a structured way for, in this case, reducing the risk of introduction and spread of Salmonella at a pig finishing farm. The decision trees are a useful tool to specify the farm specific hazards and control measures. The maximum benefit of the decision trees will probably be achieved when the decision trees are completed together with an advisor.

References:

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Summary: The purpose of the present study was to use field trials to evaluate the efficacy of a porcine-derived, defined culture (RPCF) of commensal bacteria for prevention of clinical disease from enterotoxigenic strains of Escherichia coli in weaned pigs. Neonates (< 24 h old) were orally administered RPCF and were monitored throughout the post-weaning nursery period on five geographically separated farms. The farms had a history of high mortality from F-18 strains of E. coli. RPCF-treated pigs had reduced mortality, morbidity, and medication costs from E. coli compared to untreated pigs. Although experimental, RPCF may become an effective control procedure for enterotoxigenic E. coli.

Keywords: enterotoxigenic, mortality, field trials, RPCF, medication costs

Introduction: Escherichia coli has been described as the major cause of neonatal and weaned pig diarrhea and death in pigs (Bertschinger et al., 1992). Mortality and loss of productivity from edema disease cost the U.S. swine industry millions of dollars annually. The treatment of choice for an outbreak of enterotoxigenic E. coli has been antibiotics; however, due to antibiotic resistance, new control methods need to be explored. There appears to be global interest in the use of probiotics and competitive exclusion cultures as alternatives to antibiotics. The theory of competitive exclusion cultures works on the premise that when an animal is born, the intestinal tract is a sterile environment with none of the microflora found in healthy adults of that species. The absence of the normal microflora in the neonate predisposes it for colonization by enteropathogens. If adult microflora is administered to neonates, the gut will be colonized by commensal bacteria earlier than what would occur naturally and the neonate will be more resistant to colonization by enteropathogens (Nurmi and Rantala, 1973; Lloyd et al., 1977). Some mechanisms by which commensal bacteria block colonization by pathogens include competition for nutrients, occupation of receptor and attachment sites, and production of bactericidal compounds. Our laboratory developed a defined, porcine-derived, mixed culture of commensal bacteria designated RPCF. In vitro, RPCF has prevented colonization by Salmonella and E. coli (Harvey et al., 2002). In laboratory challenge studies with enterotoxigenic E. coli, RPCF-treated pigs had reduced mortality, decreased shedding, and decreased gut concentrations of E. coli compared to controls (Genovese et al., 2000, 2001). The objective of the
present study was to evaluate the efficacy of RPCF to prevent or reduce disease associated with enterotoxigenic strains of *E. coli* in nursery-age pigs in commercial operations.

**Materials and Methods:** Five farms (four nursery and one wean-to-finish) from various geographic regions of the U.S. that had been diagnosed with enterotoxigenic (F-18 strain) *E. coli* disease were selected for participation in these trials. Each farm had a history of high mortality from F-18 strain. Nine sow units supplied weaned pigs to these farms. Piglets were orally dosed with $10^8$ colony-forming-units of RPCF within 24 h of birth, and performance records were measured from birth throughout the nursery period. Measurements included weaning weights and weaning mortality at the sow farm and average daily weight gain, feed consumption, feed efficiency, mortality and culls, and medication costs in the nurseries. A total of 34,676 pigs were included on trials and 20,217 piglets were treated with RPCF.

**Results and Discussion:** Disease associated with *E. coli* was reduced on each of the five farms. The most obvious improvement seen with RPCF treatments was decreased mortality and culls (Table 1). These results are similar to those seen in laboratory studies in which RPCF-treated piglets had reduced mortality, shedding, reduced organ invasion, and decreased GI tract concentrations when challenged with a 987p strain of *E. coli* (Genovese *et al.*, 2000, 2001). In the present study, cull losses were combined with mortality losses because the authors felt this was a more objective measure of morbidity and overall health of the herds. When mortality alone was measured, most of the RPCF-treated groups were at 1 % or less (data not shown). Decreased medication costs were calculated on four of the five farms. When projected to an annual basis, the medication cost savings were: Farm 1 = 1048 ($), Farm 3 = 18,765 ($), Farm 4 = 2970 ($), and Farm 5 = 7560 ($). The cost benefits to the producers from mortality reductions varied depending upon the size of the farm, but averaged 22,196 ($) per farm (Table 1). Cost benefits were calculated thusly: Mortality percentage difference X annual number of pigs grown X 50 ($) per pig = annual value; Medication cost difference per pig X annual number of pigs grown = annual value. On an annual basis, Farm 1 produced 2600 pigs, Farm 2 produced 8000 pigs, Farm 3, 4, and 5 produced 27,000 pigs each. There were no consistent differences observed between treatments for weaning weights or weaning mortality or for feed consumption, feed efficiency, or average daily gain. The results from these trials demonstrate that RPCF is able to reduce mortality and morbidity and reduce medication costs associated with field challenge from F-18 strains of *E. coli*. Although RPCF is not commercially available at present, once marketed it could become an alternative to antibiotics in the control of enterotoxigenic *E. coli*.

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**References**


Trichinae Certification in the United States Pork Industry

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Summary: We report here on progress in the Trichinae Certification pilot program. This program uses an on-farm auditing system to document good production practices (GPPs) for swine relative to the risk of exposure to Trichinella spiralis. The pilot phase of this program continues while regulations to establish it as an official USDA program are being developed. Launch of the Trichinae Certification Program in the United States is expected to take place when regulations are finalized within the next year. The Trichinella certification program establishes a process for ensuring the quality and safety of animal-derived food products from the farm through slaughter.

Keywords: Food Safety, Trichinella spiralis, Pork, Trichinellosis, Preharvest Pork Safety.

Introduction: Control of Trichinella infection in U.S. pork has traditionally been accomplished by inspection of individual carcasses at slaughter or by post-slaughter processing to inactivate parasites. Declines in prevalence of this parasite in domestic swine during the last thirty years, coupled with improvements in pork production systems, allows pork safety, relative to Trichinella infection, to be documented at the farm level. We report here on progress in the Trichinae Certification pilot program.

Materials and Methods: Knowledge of risk factors for exposure of swine to Trichinella spiralis were used to develop an objective audit that could be applied to pork production sites. In a pilot study, 359 production site audits were performed by trained veterinary practitioners. Verification testing of swine raised on audited sites was subsequently performed using an ELISA test.

Results: The production site audit includes an assessment of farm management, bio-security, feed and feed storage, rodent control programs, and general hygiene. In pilot studies, objective measures of management practices were obtained through a review of production records and a site inspection. Of the 359 production site audits, 342 audits (95.3\%) indicated adherence to management practices that met program standards and these sites were granted either entry into the program, or program certification. These sites will be audited regularly on a schedule established for the Trichinae Certification Program. Those sites that were audited and did not meet program standards for management practices did not gain entry into the program. Verification testing of swine from audited

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
Farm Identification U.S.) & Number Pigs on Test & Mortality difference (%) & Annual Value to Producer ($) \\
\hline
1 & 2619 & 4.80 & 6240 \\
2 & 1000 & 5.00 & 20,000 \\
3 & 13,644 & 6.20 & 66,960 \\
4 & 11,218 & 0.80 & 8600 \\
5 & 6195 & 0.85 & 9180 \\
\hline
\end{tabular}
\caption{RPCF improves profitability on E. coli problem farms}
\end{table}