Comparison of serology and culture for detecting *Salmonella* infection of 5 to 7 month old swine.

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Summary and Implications

There was a significant direct correlation between the presence of *Salmonella* in ileocecal lymph nodes and the titer of antibody to *Salmonella* in meat juice. It was also demonstrated that there is no significant correlation between titer of antibody in serum collected from pigs immediately prior to slaughter and the presence of *Salmonella* in the feces on the floor of pens. These conclusions suggest that the level of antibody to *Salmonella* in meat juice can be used to determine whether or not groups of pigs at slaughter contain *Salmonella* in their ileocecal lymph nodes.

Introduction

Foodborne infections caused by the ingestion of *Salmonella* are of major concern in the United States. Many outbreaks of *Salmonella* have been associated with contaminated animal products, including pork and pork products. Efforts to reduce the levels of *Salmonella* contamination in pork may rely on rapid economical methods of detecting farms that produce slaughter pigs with high levels of *Salmonella*. Recently, an indirect ELISA (mix-ELISA) was developed in Denmark for the purpose of identifying such farms (Nielsen et al., 1995a). The purpose of this study was to evaluate the mix-ELISA as an indicator of *Salmonella* infection in pigs.

Materials and Methods

Two studies were conducted. In study number one, samples were collected when a group of pigs was within at least two weeks from marketing. Fecal specimens were collected from the floors of randomly selected pens of pigs.

In study number two, ileocecal lymph node samples were collected from slaughtered animals as they passed through the evisceration stage of the slaughter process. Meat samples were collected during evisceration or after carcasses had been identified and moved into refrigerated storage. When meat and lymph node samples were collected at evisceration, samples were identified by carcass. When meat samples were collected in refrigeration, samples of lymph nodes and meat were identified only to the farm of origin.

Salmonella-specific antibodies in serum and meat juice were detected by the mix-ELISA as described by Nielsen et al., 1995a.

The presence of *Salmonella* in pen feces and ileocecal lymph nodes was determined by culture as described (Fedorka-Cray et al., 1995).

Results and Discussion

In study number one, results obtained from pen fecal culture and serum mix-ELISA were compared with each other. In study number two, the results of ileocecal lymph node culture and meat juice ELISA were compared with each other.

In both studies, an experimental unit was defined as a population of 5- to 7- month-old swine at or within two weeks of slaughter. At least 28 samples of blood and pen feces, or meat and ileocecal lymph nodes, were collected from each experimental unit per month for testing. This sample size gave 95% confidence of being able to detect a 10% infection rate in any sized population of cross-bred swine. In study number one, 1,592 pen fecal samples and 1,254 serum samples collected from 47 groups of pigs. These samples represented monthly collections for one year from one farm, ten monthly collections from another farm, and 23 collections over seven months from a third farm.

Serum and meat juice results for each group of pigs were expressed as the percent positive for each OD%. Then, for each OD% cutoff, each group of pigs was designated positive or negative according to Nielsen et al., 1995b. Pen fecal and ileocecal culture results were expressed as the percent positive and categorically as positive or negative.

In study number two a total of 1,392 lymph nodes and 1,319 meat juice samples were collected from 32 groups of pigs. These samples represented monthly collections for 7 months from 17 finishing complexes from one farm and four monthly collections from two farms. All farms were located in the upper Midwest.

In study one, 18 of 47 groups of pigs had *Salmonella* isolated from the pen fecal samples. Groups of pigs that were positive had 3 to 17% of all pen fecal samples that were culture positive. The number of sero-positive groups of pigs varied with the cut-off level used.

In study two, 23 of 32 groups of pigs had *Salmonella* isolated from ileocecal lymph nodes. Groups of pigs that were positive had 1 to 62% of all ileocecal lymph nodes that were culture positive. The number of meat juice positive groups of pigs varied with the cut-off level.

Correlation coefficients were determined for the ordinal data and for categorical data.

There was no direct correlation between the finding of *Salmonella* in environmental fecal samples and the level of antibody to *Salmonella* in pigs. It should be noted that this conclusion does not suggest that environmental sampling cannot detect *Salmonella* in the pens of pigs.

There was a significant direct correlation between the finding of *Salmonella* in ileocecal lymph nodes and the level of meat juice antibody to *Salmonella* in pigs. These results suggest that the mix ELISA could be used to monitor the *Salmonella* status of farms by examining meat juice samples of pigs collected at slaughter.

References

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