THE CORRELATION BETWEEN SEROLOGY AND ISOLATION OF SALMONELLA IN PIGS AT SLAUGHTER IN SOUTHERN BRAZIL

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Abstract In southern Brazil the isolation of Salmonella from pigs and pork has been previously reported. The aim of this study was to compare results of seroprevalence and Salmonella isolation from intestinal contents of slaughtered pigs, and to identify the probable contamination source for these herds. Blood and intestinal contents from pigs of 58 herds (15 pigs/ herd) were sampled. Three fecal samples originating from pigs of the same herd were pooled, resulting in five pools/ herd. Fecal pools were submitted to an isolation protocol as previously described. Blood samples were individually submitted to an ELISA test developed in Brazil, that includes LPS antigen from S. Typhimurium. Serology and isolation results showed that the farm was the most important Salmonella contamination source for pigs slaughtered in this abattoir. Among herds with higher seroprevalence, the slaughter at the beginning of the day was associated with a smaller number of positive Salmonella fecal pools.

Introduction Previous studies conducted in southern Brazil reported the isolation of Salmonella from pigs and pork (Bessa et al., 2004, Castagna et al., 2004). Pigs can become infected with Salmonella on farm, during transport, in the lairage or at slaughter (Swanenburg et al., 2003). Consequently, all steps of the pork production chain must be monitored and included in a control program. Serology results indicate a previous Salmonella exposure of the herd, while caecal-content samples submitted to isolation protocols demonstrate the presence of Salmonella in the intestine. If the intention is to monitor Salmonella pre-harvest, measurement of antibodies (herd serology) or bacteriological examination of caecal-contents are appropriate (Sorensen et al., 2004). Furthermore, in conditions where transport time and duration of lairage is longer than 3 hours, the comparison of serology and isolation results might contribute to assess the relative importance of the farm and of the lairage as a contamination source for slaughtered pigs. Thus, the purpose of this study was to compare the results of serology and the isolation of Salmonella from intestinal contents of pigs slaughtered in one abattoir in southern Brazil, where transport time and waiting period is longer than 3 hours.

Materials and Methods The study was carried out from July to November 2004 in one abattoir located in southern Brazil. In previous studies, a high Salmonella prevalence was found among slaughtered pigs in this abattoir. Blood and intestinal contents from pigs of 58 herds (15 pigs/ herd) were sampled. Three fecal samples originated from the same herd were pooled, resulting in five pools/ herd. Fecal pools were submitted to an isolation protocol, as previously described (Michael et al., 2003). Blood samples were individually submitted to an ELISA test developed in Brazil, that includes LPS antigen from S. Typhimurium (Kich, 2004). The proposed cut-off for this test is the OD 0.169, which represents the mean OD value of a negative population of 275 pigs plus four standard deviations.

Results A total of 870 pigs were included in this study, of which 81.5% were positive in the Typhimurium-ELISA. Salmonella was isolated from 90 (31.03%) pooled fecal samples. Thirty one herds (68.8%)
with serological prevalence >70% had at least one positive fecal pool, while 14 herds were negative on Salmonella isolation. Only 8 herds were assigned in the serological level <40%, five of these herds were negative on Salmonella isolation (Figure 1). Most of herds (10/14) showing seroprevalence >70% and none positive fecal pools belonged to batches slaughtered at the beginning of the day (batches 1-4). On the other hand, we found that the herds positive on Salmonella isolation and with seroprevalence <40% had pigs slaughtered at the end of the day.

**Discussion** Results of serology showed that the farm was the most important Salmonella contamination source for pigs slaughtered in this abattoir. A strong correlation was observed between seroprevalence levels and isolation of Salmonella from faecal pools. Despite of this, in a high number of herds with seroprevalence >70%, Salmonella could not be isolated from fecal pools. The high seroprevalence can reflect early infection, late infection or even re-infection of pigs. In all situations, pigs originating from herds with serologically positive status, can have recovered from infection and be bacteriologically negative at the time of slaughter (Van Winsen et al., 2001; Kranker et al., 2003). Furthermore, Rostagno et al. (2003) proposed that the contaminated environment of the holding pens can be a significant source of Salmonella infection for seronegative pigs prior to slaughter. The waiting time greater than 6 hours, observed in the present study, may have provided a higher exposure of pigs to Salmonella present in the lairage pens. In addition, the waiting period can contribute to the increase of stress, resulting in a higher number of Salmonella shedders in the herd.

The cut-off adopted in this study may have contributed to the large number of herds assigned to the higher seroprevalence level. Previous studies demonstrate a high correlation between the adopted cut-off and Salmonella isolation in naturally infected herds (Kich, 2004). However, a higher cut-off may have to be decided to start an acceptable surveillance program in the pork production system assessed in our work. This strategy has been adopted in nation-wide control programs, that started with a high cut-off points, and were submitted to adjustments when the Salmonella prevalence decreased.

**Conclusion** Results of serology and Salmonella isolation showed that the farm was the most significant source of contamination for pigs slaughtered in this abattoir.

**References**


