Epidemiology of salmonellosis in sow units of Catalonia (Spain)

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Summary: A bacteriological study aimed to the detection of sows excreting Salmonella was carried out in 74 sow units. Individual faecal samples were collected and a detailed questionnaire was filled in each farm and the data gathered were used in a bivariate logistic regression analysis to determine risk factors for Salmonella positivity. In 18 farms (24.32%) Salmonella carriers were detected. Of the total 1480 samples analysed, 50 were positive (3.38%), accounting for 11 different serotypes. Within positive farms, 13.8% of sows were positive. Epidemiologic analysis of the results showed three main risk factors: to have open-flushed drainage of slurry, rodent control, and the number of sows in the unit. Our results showed that, in infected farms, the proportion of sows actively excreting Salmonella was considerably high (3.38%). This fact, and the risk factors detected should be taken into account when designing effective plans for the control of salmonellosis in sows.

Keywords: Salmonella, Carrier, Risk factors, Catalonia, Swine

Introduction: Salmonella infection is a recognised problem in pig-meat production. The greatest emphasis in reducing S. enterica contamination has focused on finishing swine. A study demonstrated that sows are a potential source for S. enterica (McKean et al., 2001). However, detailed scientific results are fewer in this age group. The aim of the present study was to determine the prevalence of sow units of Catalonia having active Salmonella excretors and to figure out what risk factors can contribute to the presence of this infection in sow units.

Materials and methods: A bacteriological survey was conducted on a representative sample of swine farms of Catalonia. The initial hypothesis was that at least 20% of the farms would have active Salmonella carriers in sow units. Considering that the total census of pig farms with sow units is 5742, the total number of farms to be examined was 61 (± 10% precision, confidence level 95%). If a farm was positive it was considered that, at least, 15% of the animals would be active carriers. This level is an important risk factor. This fact has been reported previously (Funk et al., 2001) and confirms that this practice should be avoided if salmonellosis is to be controlled. On the other hand, large fattening units were more prone to have positive animals than small ones. One possible explanation is that these large units usually receive animals from different source farms, increasing thus the chance to introduce infected pigs. Taken together, these results indicate that salmonellosis is widespread in swine farms of Catalonia (Spain) and that implementation of control measures is urgently needed.

References:
implied to sample 19 animals per unit. Individual fecal samples were collected and inoculated in Rappaport-Vassiliadis broth. Incubations were done at 42 °C and transfers to XLT4 agar were done after 24 and 48 hours of incubation. Suspicious colonies were further identified by routine biochemical tests and later serotyped. For each farm a detailed questionnaire was filled. This questionnaire included 84 questions about health, production, facilities, medications and husbandry practices of the surveyed farms. Results of bacteriological examinations and data gathered in the questionnaires were analysed by using Epi-Info 2002. Variables yielding p-values < 0.20 were further included in a logistic regression analysis.

Results and discussion: A total number of 74 sow units were finally examined. In 18 of them (24.32 %, 95 % confidence interval 15.42 % - 35.93 %) Salmonella carriers were detected. Of the total 1480 samples analyzed, 50 were positive corresponding to an overall individual prevalence of 3.38 % (2.54 % – 4.46 %). Within positive farms, 13.8 % of sows were positive. Eleven different serotypes were isolated. The statistical analysis of the results showed three main risk factors: to have open-flushed drainage of sewage, rodent control, and the number of sows in the unit (Table 1). However, the logistic regression model only explained 33 % of the cases, indicating other important risk factors that could not be identified.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio (95 % Confidence interval)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-flushed slurry drainage</td>
<td>34.48 (1.22-100.0)</td>
<td>0.03</td>
</tr>
<tr>
<td>Rodent control implemented</td>
<td>0.054 (0.003-0.87)</td>
<td>0.03</td>
</tr>
<tr>
<td>&gt;250 sows in farm</td>
<td>9.26 (1.15-74.62)</td>
<td>0.03</td>
</tr>
<tr>
<td>MLE of the model: 33.78 %, p= 0.003</td>
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Table 1. Significant variables in the logistic regression model

Several studies have shown that sows have an important role in the epidemiology of salmonella in swine (Kranker et al. 2001; Letelier et al. 1999). In our study about one fourth of the examined units had active Salmonella carriers indicating a wide extension of the infection. Most important, the proportion of active excretors in infected farms was considerably high, a fact that implies an increased risk of transmission to offspring. Most often, the positive status in sows is related to the type of feed used (Kranker et al., 2001). However, in our case we were not able to identify any of the feeding-related variables (pelleted feed, etc.) as a risk factor. In contrast, rodents and the type of drainage of slurry were detected as significant risk factors. Rodents are known to be carriers of Salmonella. Barber et al. (2002), detected 8 % of rodents as active excretors of Salmonella in swine farms, having thus a possible role as reservoirs. Regarding the number of sows in the farm, this might be an indirect indicator of the number of replacement gilts introduced in the herd. On the other hand, slurry is also a source of contamination for birds, rodents and also can contaminate boots, etc. As a conclusion, a considerable proportion of the investigated sows were found to be actively infected. This fact, and the risk factors detected should be taken into account when designing effective plans for the control of salmonellosis in sows.

References

