CONTAMINATION PRIOR TO AND DURING SLAUGHTER

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Introduction

In Germany, a quality management and assurance program is being introduced for the entire food chain from feed production up to the retail (1). This "QS"-System (QS stands for Quality and Safety) is targeted at guaranteeing the compliance with the basic quality criteria throughout the production chain. The program has been running for 2 years. Participation in the QS-System is voluntary. However once a producer has decided to be a participant his participation in the QS Salmonella Monitoring System is mandatory. In 2004 about 20,000 (QS) herds are included. Random samples of meat juice from every participating herd (sixty per year, evenly distributed over the shipments from the herd in question) are tested for salmonella antibodies. After one year (i.e. after sixty sample results) every participating herd is assigned to the following categories:
Cat. I: < 20% of the samples are salmonella-antibody positive, i.e. the risk of introducing salmonella into the slaughterhouse is low
Cat. II: 20% to 40% of the samples are salmonella-antibody positive, i.e. the risk of introducing salmonella into the slaughterhouse is medium
Cat. III: > 40% of the samples are salmonella-antibody positive, i.e. the risk of introducing salmonella into the slaughterhouse is high (2).
The monitoring results (categorization) are to be the basis for continuously reducing the salmonella frequency in the pork chain. According to these results the following three major intervention measures are being implemented:
1.) Supporting owners and producers of pig herds to reduce the salmonella load of their herds
2.) Logistic slaughter through separating pigs from Cat. III from pigs from Cat. I and II at slaughter (4)
3.) Targeted measures for reducing salmonella cross contamination during slaughter of pigs from Cat. III herds (3)
The objective of this study was to identify risk areas for cross contamination in the slaughter procedure from lairage to chilling to be able to develop targeted intervention measures for minimizing cross contamination.

Material and Methods

The investigations took place in a slaughterhouse in the North-West of Germany with a capacity of 10,000 slaughtered pigs per week. At first, following the HACCP-Concept, a salmonella specific hazard identification took place resulting in a plant specific sample collection plan targeted at verifying potential high risk areas for the salmonella cross contamination.
The sampling focused on: lairage (before, during and after a week´s slaughter), slaughterline (direct and indirect contacts such as: intestine bowls, scalding tank, scalding water, surface areas with direct contact to the carcasses, surrounding areas such as walls and floors), tonsils and retained gut residues still attached to the carcass.
In the lairage swab samples were taken and 5 samples per pen were pooled and processed. Most of the samples at the slaughterline and their surroundings were taken by a wiping method. Pieces of cotton were moistened with buffered peptone water, packed into a plastic bag and sterilized. During sampling the bag was turned inside-out, was pulled over the hand to avoid contact between hand and cotton, the sample was collected by wiping the surface with the cotton, and then the bag was pulled back to cover the piece of cotton.
The tonsils were taken from the pluck with sterilized instruments. They were flamed to remove potential surface contamination and then some cuts were made using a sterilized scissor to expose the inner bacterial flora.
All samples were cultured according to ISO 6579.

Results

From 240 collected samples 39 were found positive. There were 96 samples taken in the lairage. 12 positive samples were found before and during slaughter, 8 positive samples after slaughter and 5 positive samples were found on Sunday in the totally cleaned lairage. Four water troughs were sampled and one of them was found positive. From 95 sampled tonsils 8 were found positive. Other positive findings were: two times an intestine bowl after cleaning and disinfection, surroundings of the splitter, piece of gut still attached to the carcass and the floor between the slaughter area and the cantine.

12.5.2003

13 swab samples lairage, before slaughter	1 positiv	
9 swab samples lairage, after slaughter	0 positiv	
20 tonsils	0 positiv	

19.5.2003

20 tonsils	4 positive	

20.5.2003

11 swab samples lairage, before slaughter	5 positive	
8 swab samples lairage, after slaughter	2 positive	

16.6.03

10 swab samples lairage, Sundays (15.6.)	5 positive	
9 swab samples lairage, after slaughter	6 positive	
20 tonsils	1 positive	

23.6.2003

8 swab samples lairage, after slaughter	2 positive	
16 tonsils	2 positive	

24.6.2003

7 swab samples lairage, after slaughter	4 positive	

30.6.2003

13 swab samples lairage, before slaughter	0 positive	
6 swab samples lairage, after slaughter	0 positive	
2 samples scalding water	0 positive	
19 tonsils	1 positive	

7.7.2003

1 sample gut attached to carcass	1 positive	
4 swab samples water troughs	1 positive	
2 wiping samples under the air filter in the lairage	0 positive	
10 wiping samples surrounding slaughterline	1 positive (surrounding splitter)	

28.7.2003

11 wiping samples surrounding slaughterline	2 positive (intestine bowl after cleaning)	
1 sample feces in carcass	0 positive	
2 samples gut attached to carcass	0 positive	

13.8.2003

7 wiping samples personnel rooms	0 positive	
7 wiping samples slaughterline before slaughter	0 positive	
3 wiping samples slaughterline during slaughter	0 positive	
1 wiping sample crossway canteen/ slaughterline	1 positive	
1 wiping sample washbasin at crossway	0 positive	

Discussion

Out of the identified “cross contamination areas” the lairage area has by far the highest impact on the cross contamination and on the salmonella load that is finally carried into the slaughter and processing area for pork. Even if the number of salmonella carrying slaughter pigs can be reduced by successful intervention measures at farm level, a salmonella cross contamination due to a poor lairage management can make all efforts of the producers and their veterinarians in vain.

Most intervention measures focus on faecal contamination. However, our study shows that the tonsils are of equal importance.

Another “problem area” for cross contaminating salmonella is the multitude of the daily minor violations of hygiene and separation rules such as unintended crossroads between “black” and “white” areas.

Furthermore, it is obvious that cleaning and decontamination of direct contact surfaces, such as intestine bowls for example, have to be improved!

Conclusions

Risk categorization of herds without strict separation of high and low risk herds for slaughter (logistic slaughter) is useless.

Targeted salmonella cross contamination reduction measures during the entire slaughter process need to be an indispensable part of overall salmonella reduction programmes!

References

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