

Different ways of handling the bung (rectum) during pig slaughter dressing related to *Salmonella* sero-positivity in slaughtered pigs and the number of *Salmonella* positive meat samples

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Introduction

Some of the elements of the Danish *Salmonella* Surveillance and Control Programme are surveillance of slaughterpig herds and surveillance of the *Salmonella* prevalence in fresh pork.

All herds delivering more than 100 slaughter pigs per year are included in the surveillance. At the slaughterhouses meat samples are collected randomly according to the legislation from the Danish Veterinary Service. The meat samples are analysed at The Danish Veterinary Laboratory for the presence of specific *Salmonella* antibodies by an indirect enzyme-linked immunosorbent assay, the so-called mix-ELISA (1). The results of the analysis are registered in the Zoonosis data base owned by the Danish Ministry of Food, Agriculture and Fisheries. The results are registered under the herd specific Central Herd Register (CHR) number. Depending on the sero-prevalence during the previous three months the herds are assigned to one of three levels: Level 1 including the herds with no or very few reactors, Level 2 the herds with higher sero-prevalence, or Level 3 the herds with an unacceptable high sero-prevalence.

At the slaughterhouses in Denmark a total of 2200 samples of pork and offal are analysed every month for the presence of *Salmonella* bacteria. The number of samples of fresh pork is about 1200 - 1400 every month. All results are registered in a database at The Danish Veterinary Service, but the results from the slaughterhouses members of the Danish Bacon and Meat Council are also registered in a database at the head office. At the end of 1998 the database contained more than 87.000 data on fresh pork collected since June 1993.

In 1998 the prevalence of *Salmonella* in fresh pork was 1,2 pct. Even though the *Salmonella* prevalence in fresh pork is very low, the results of the many data could reveal any relationship between different dressing procedures and the *Salmonella* prevalence in fresh pork.

Materials and Methods

A questionnaire was developed containing different questions concerning dressing procedures and sampling procedures. A questionnaire was sent to all slaughterhouses members of the Danish Bacon and Meat Council. The questionnaires were completed by the kill floor manager and the head veterinarian.

The answers were related to the *Salmonella* prevalence in fresh pork. To eliminate any differences due to difference in *Salmonella* sero-positivity in the slaughterpigs at the different slaughterhouses, the results from the serological herd surveillance were included in the study.

The study included a total of 20 slaughterhouses, 14.000 results of analysis of fresh pork and the meat juice sero-prevalences for the period August 1997 to July 1998.

Statistical Methods

The number of positive samples of fresh pork was analysed as the dependent variable taking into account the sum of positive and negative samples, thus forming a binomial distribution model. A total of 11 questions and the meat juice sero-prevalence formed the possible explanatory variables. The explanatory variables were added to the null model in a stepwise manner as long as the fit of the model was improved evaluated by means of likelihood ratio test statistic.

Results

Three of the questions in the questionnaire influenced significantly the prevalence of *Salmonella* positive samples of fresh pork. This study only deals with the different ways of handling the bung and the relationship between this, the meat juice sero-prevalence and the prevalence of *Salmonella* positive samples of fresh pork is shown in figure 1.

Different dressing procedures are used at the Danish slaughterhouses when removing the intestines. Most of the slaughterhouses use a 40 cm long narrow plastic bag being everted over the bung (rectum). At some slaughterhouses a knot including the plastic bag is tied on the bung. The effect of the plastic bag has been described in 1994 (2). Another procedure is using the so called 'gutter'-solution, where a metal bar is keeping the bung away from the carcass after loosening.

The results of this study confirmed that the plastic bag everted over the bung supplemented with a knot is significantly the best procedure. Second best was the plastic bag being everted over the bung but without the knot, and the least efficient procedure was the 'gutter'-solution.

Discussion

Removal of the intestines is critical for contaminating the carcass with *Salmonella* bacteria or other intestinal zoonotic pathogens. As the classical meat inspection can only reveal faecal contamination if it is visible, it is of great importance to choose the dressing procedures which constitute the lowest risk of transfer of intestinal bacteria to the carcass.

References

1. Nielsen, B., D.L. Baggesen, F. Bager, J. Haugegaard, and P. Lind, 1995. The serological response to *Salmonella* serovars typhimurium and infantis in experimentally infected pigs. The time course followed with an indirect anti-LPS ELISA and bacteriological examination. *Vet. Microbiol.*, 47: 205-218.
2. Nesbakken T., Nerbrink E., Røtterud J., and E. Borch, 1994. Reduction of *Yersinia enterocolitica* and *Listeria* spp. on pig carcasses by enclosure of the rectum during slaughter. *Int. J. Food Microbiol.* 23: 197-208.

Percent positive pork samples

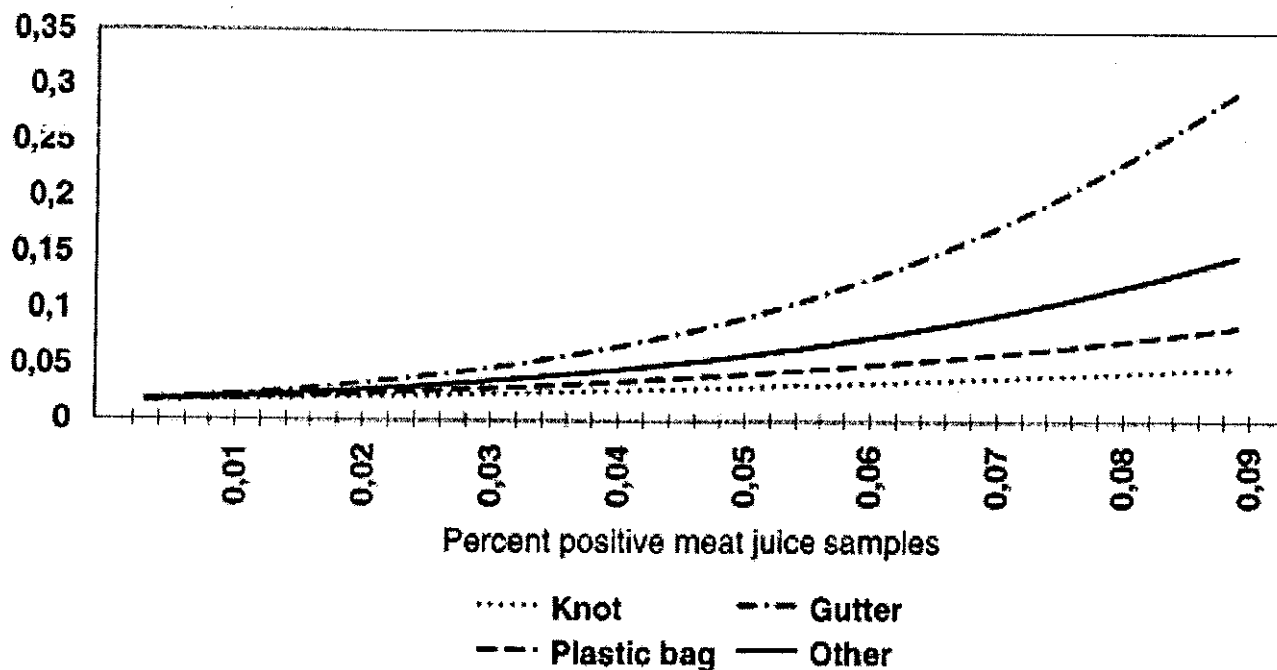


Figure 1: Estimated relationship between different ways of handling the bung, the meat juice sero-prevalence and the prevalence of *Salmonella* positive samples of fresh pork.