THE USE OF A HACCP-BASED CONTROL SYSTEM IN CLOSED PIG HERDS

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Summary: To fulfil the consumer demands about food safety, quality control systems are necessary in the entire food production chain, including pig production. One of the tools to control quality is a HACCP-system, based on control points. The aim of present study was to define control points in 12 closed pig herds based on slaughterhouse data. Herd data, obtained by questionnaires, comprised data about housing and ventilation, management, feeding, hygiene, prevention of diseases and transport to the slaughterhouse. Outcome variables for the univariate analysis were the percentage of animals with lung lesions, pleuritis, dermatitis scores, white spots on the liver and the *Salmonella* prevalence. The results of this study should be interpreted with caution, since the analysis was carried out on no more than 12 herds and because no multivariate analysis was done. However, it is clear that slaughterhouse data are essential for the farmer to optimize the production of healthy and safe pigs.

Introduction: Quality can be ensured by the use of quality control systems such as a HACCP (Hazard Analysis of Critical Control Points)-based system, based on risk factors or critical control points (Anonymous, 1991). The use of such a system in the pig herds has recently been introduced. The aim of present study was to find the risk indicators for lung lesions, white spots on the liver, *Sarcoptes scabiei* and *Salmonella* by use of slaughterhouse data.

Materials and Methods: Herd data were collected by means of a questionnaire on 12 farrow-to-finish herds belonging to one slaughterhouse co-operation. The questionnaire comprised information about management, housing and ventilation, feeding, hygiene and biosecurity, prevention of diseases and transport to the slaughterhouse. Following slaughterhouse data were obtained from 10 consecutive slaughterhouse deliveries per herd: the percentage of animals with white spots on the liver, with *Sarcoptes scabiei* dermatitis, with lung lesions and with pleuritis. The percentage of *Salmonella*-infected animals was determined in a previous field study and was based on bacteriological isolation in lymph nodes. Data were analysed using a univariate analysis at a level of significancy 0.2 (SPSS 11.0).

Results: The percentage of animals with white spots on the liver, with Sarcoptes scabiei dermatitis, with lung lesions and with pleuritis was 12.3%, 0.6%, 8.5% and 6.5%, respectively. The average number of *Salmonella*-infected animals was 38.4%. The most important risk indicator for white spots was the management system, with an all-in/all-out system protective compared to a continuous system (p=0.13). *Scarcoptes scabiei* could be prevented by the systematic use of antiparasitical drugs (p=0.10). Also quality label organisations can impose measures to reduce the prevalence of *Scarcoptes scabiei* (p=0.00). Important factors to prevent lung lesions are an adequate ventilation system (p=0.13), the implementation of a quarantine period for at least 4 weeks (p=0.16), the use of an all-in/all-out production system (p=0.04), a stand-empty period for minimum 3 days (p=0.05), the preventive use of antibiotics (p=0.20) and vaccination of boars and sows against PRRSV (p=0.03). The percentage of animals with pleuritis could be reduced by the use of a stand-empty period for minimum 3 days in the finishing unit (p=0.19), the correct use of ventilation systems (p=0.13), the eradication of rodents (p=0.19), the use of an all-in/all-out system (p=0.08) and vaccination of boars and sows against PRRSV (p=0.03) and Influenza (p=0.18). Important protective factors associated with a lower *Salmonella*-prevalence are the purchase of boars (p=0.02), the feeding of meal (p=0.08), the use of all-in/all-out

(p=0.13), an adequate rodent eradication program (p=0.01) and the with-holding of feed for maximum 18 hours before transport to the slaughterhouse (p=0.13).

Discussion: The application of a herd-specific HACCP-plan on pig herds can be a useful tool to guarantee product quality and safety and can be part of an Integrated Quality Control System (Noordhuizen and Frankena, 1999). In the present study, possible risk indicators for several diseases were investigated. This risk analysis can be the basis for the determination of the critical control points. It is important for the farmer to obtain feed-back from the slaughterhouse to be informed about the disease status of his animals. Several diseases, like *Salmonella*, occur subclinically in pigs, but can cause human disease. Other infectious agents, like *Mycoplasma*, *Actinobacillus pleuropneumoniae*, *Ascaris suum*, or *Sarcoptes scabiei*, do not manifest clinical symptoms or visual lesions, but can be the cause of a reduced feed consumption and subsequently retarded growth. The risk factors were the result of a univariate analysis with significance at the 0.2 level. This means that the results should be interpreted with caution and no definitive conclusions can be drawn. Another limiting factor in the study is the low number of herds, due to by practical and budget considerations.
The strict use of a HACCP-system on pig herds however is a utopia. It is impossible to control all risk factors, since the product is a living animal which is subject to a lot of variable factors. However, a HACCP-based system can be useful to reduce the hazards associated with the consumption of meat.

Conclusions: Pig farmers can apply a HACCP-based quality system to ensure the delivery of healthy and safe pigs to the slaughterhouse. It is possible to define risk indicators and consequently control points by feedback of slaughterhouse data.

References:

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PE 09 USDA Multi-Agency Project: Collaboration in Animal Health, Food Safety & Epidemiology (CAHFSE)

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Summary: Despite producer interventions, on-going research and continued surveillance, food borne outbreaks continue and multiple antimicrobial resistant bacteria have emerged. A multi-agency APublic Health Action Plan to Combat Antimicrobial Resistance@ was developed to address these concerns and one USDA response was the development of the Collaboration in Animal Health, Food Safety and Epidemiology (CAHFSE), a partnership among the Agriculture Research Service (ARS), Animal and Plant Health Inspection Service (APHIS), and Food Safety Inspection Service (FSIS. The objective of CAHFSE is to implement and expand a surveillance system patterned after the APHIS National Animal Health Monitoring System (NAHMS) which focuses on animal health and food safety. Swine is the first commodity in CAHFSE. To date, fecal samples from 8 farms have been collected and processed for culture of *Salmonella, Campylobacter, Enterococci* and *E. coli.* Preliminary results indicate that all four bacteria have been recovered from a number of operations and are currently being characterized.