

Bacterial infection risk associated with outdoor organic pig production with special reference to *Salmonella* and *Campylobacter* infection

Ph.D. period: From 1 Oct. 2002 to 30 Sept. 2005.

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Co-supervisors: Dorte Lau Baggesen, Senior research officer, Ph.D. Department of Bacteriology, Danish Veterinary Institute and Eva Møller Nielsen, Senior research officer, Ph.D., Statens Serum Institut.

Objective

The objective of this project is to improve the knowledge on the risk of outdoor pig production in relation to spread and persistence of *Campylobacter* and *Salmonella* infections. For *Salmonella* the specific objectives are to evaluate the survival of *Salmonella* Typhimurium in soil and grass of contaminated pastures used for outdoor pig production, measurement of the infectivity of naturally *S.* Typhimurium contaminated pastures in relation to time, and in the case of high infectivity, evaluation of the pathogen reducing effect of soil treatment. For thermophilic *Campylobacter*, the objectives are to describe the infection dynamics of natural *Campylobacter* infections over time in outdoor pigs, including time of colonisation, level of excretion in faeces, species distribution in the group and in the individuals, interaction with the environment, and to describe the possible changes in prevalence and species distribution in relation to time and environmental contamination.

Progress 2004

In order to elucidate the potential source of the non-inoculum *Salmonella* serotypes found in the experiment, wildlife such as crow birds and mouse were collected for a period in cooperation with the Danish Pest Infestation Laboratory, and these animals were examined for *Salmonella* and *Campylobacter*. However, *Salmonella* was not found. These results were presented at a seminar in Holland and have in relation here to been accepted (sept. 2004) for publication in a small paper (Jensen et al., High diversity of *Salmonella* serotypes found in an experiment with outdoor pigs, NJAS, Wageningen Journal of Life Sciences).

The specificity of the developed real-time PCR method for identification of thermophilic *Campylobacter jejuni*, *C. coli*, *C. lari*, *C. upsaliensis* and the DIG-labelled nucleotide probe for detection of *Campylobacter jejuni* colonies were further proven with a range of non-*Campylobacter* but related bacteria. Furthermore, there was made a comparison of the capability of the different methods to specifically detect *C. jejuni* in pig samples from the experimental study. This has been presented in a paper that has yet been submitted (A. N. Jensen, M. T. Andersen, A. Dalsgaard, D. L. Baggesen and E. M. Nielsen. Development of real-time PCR and hybridization methods for detection of thermophilic *Campylobacter* spp. in pig faecal samples, submitted to Journal of Applied Microbiology).

The approximate 1000 bacterial *Campylobacter* isolates obtained from pigs, pasture environment and birds and rats from the surrounding area have been identified with the real-time PCR method. The serotyping of selected strains has been initiated but will continue.

Seminar

Bacterial infection risk associated with outdoor organic pig production - including a small survey of wildlife as a reservoir of *Salmonella* and *Campylobacter*. Presentation Seminar, Rodent Control Strategies in Organic Pig and Poultry Production Systems, 26-28 May, 2004, Wageningen, The Netherlands.

Enhancing animal health security and food safety in organic livestock production systems, 16th-18th Sept. 2004, SAFO (Sustaining Animal Health and Food Safety in Organic Farming) 3rd Workshop Falenty, Polen.

PhD courses: - participation in

Statistics for veterinarians, 9 ECTS, Infection microbiology (15 ECTS) and SOAR Summerschool: Is Organic Farming the Key to Sustainability? (4 ECTS).

Publications

A.N. Jensen. Jensen, Annette Nygaard (2004) [Risiko for salmonella ved økologisk griseproduktion](#) [Risk of salmonella in organic pig production]. Klumme i Økologisk Jordbrug, submitted sept. 2004.

Jensen, Annette Nygaard and Nielsen, Eva Møller (2003) [Campylobacter species distribution in outdoor pigs: Oral presentation O44](#). Paper presented at SAFEPORK 5th International Symposium on the Epidemiology and Control of Foodborne Pathogens in Pork, Hersonissos, Crete, Greece, October 1-4, 2003; Published in Leontides, Leonidas, Eds. *Proceedings. SAFEPORK 5th International Symposium on the Epidemiology and Control of Foodborne Pathogens in Pork.*, page 134-136.

Plans for 2005:

All the data obtained from the experimental salmonella study, will be analysed and finally submitted as a scientific paper, in a journal with referee. The analysis of the campylobacter data, including serotyping and potentially pulse-field-gel-electrophoresis (PFGE) of selected strains will continue in order to elucidate the strain diversity and the possible interaction with the environment. These results will also be published in an international journal.

We will try, on basis on the knowledge obtained from the experimental study and the available database information on organic pig herds, to assess the key points of concern in terms of minimizing salmonella problems in organic pig production.

The results of the experimental study will also be presented at an international congress.