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

The modern consumers are becoming increasingly critical of the quality of meat and other types of products of animal origin. Focus is put on the animal husbandry and the way of production concerning animal welfare. This leads to increasing interest for organic, free-range or other kinds of animal-friendly production systems where the animals benefit from a low animal density and good possibilities for expressing normal behaviour. In general, consumers also expect products from these kinds of systems to be of a higher microbiological quality compared to products from conventional production systems. However, today there is no documentation for a lower level of the most common zoonotic bacterial infections (e.g. *Salmonella*, *Campylobacter* and *Yersinia*) in organic or other alternative production systems.

Objective

The objective of this project was 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 were 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.
An experimental study design for organic pig production was sat up on the research farm, Rørrendegård, in order to perform a *Salmonella* infection study and examine the natural *Campylobacter* infections in organic pigs.
The *Salmonella* infection study and the examination of natural *Campylobacter* infections in organic pigs were performed through an experimental set-up for organic pig production at the research farm, Rørrendegård.

Progress - 2006

Submission of Ph.D. dissertation: Bacterial infection risk associated with outdoor organic pig production –exemplified by *Salmonella* and *Campylobacter*.
The Ph.d. degree was obtained 24 March 2006.

Conferences (oral presentations)

Jensen, A.N. and Baggesen, D.L. *Salmonella* infection risk associated with outdoor organic pig production. pp 548-549 *In* Andreasen, Elsgaard, Søndergaard and Hansen (Eds.), Proceedings of the European Joint Organic Congress, 30-31 May 2006, Odense, DK

Jensen, A.N. and Baggesen, D.L. 2006. *Salmonella* and *Campylobacter* infections in outdoor organic pigs. pp 96-97 *In* Gopalakrishnan, O., Melotti, L., Ostertag, J., Sorensen, N. (Eds.). Proceedings of the 1st IFOAM International Conference on Animals in Organic Production, August 23-25 2006, St. Paul, Minnesota

Publications

Peer-reviewed

Jensen, A.N.; Dalsgaard, A. Baggesen, D.L and Nielsen, E.M. (2006). The occurrence and characterization of *Campylobacter jejuni* and *C. coli* in organic pigs and their outdoor environment. Vet. Microbiol. 116: 96-105.

Jensen, A.N.; Dalsgaard, A. Stockmarr, A., Nielsen, E.M. and Baggesen, D.L. (2006). Survival and transmission of *Salmonella enterica* serovar Typhimurium in an outdoor organic pig farming environment. Appl. Environ. Microbiol. 72 (3): 1833-1842.

Jensen, A.N.; Andersen, M.T.; Dalsgaard, A.; Baggesen, D.L. and Nielsen, E.M. (2005) Development of real-time PCR and hybridization methods for detection and identification of thermophilic Campylobacter spp. in pig faecal samples. *J. Appl. Microbiol.* 99: 292-300.

Jensen, A.N.; Lodal, J. and Baggesen, D.L. (2004) High diversity of salmonella serotypes found in an experiment with outdoor pigs. *Wageningen Journal of Life Sciences* 52(2):s 109-117.

Not peer-reviewed

Jensen, A. N. and Baggesen, D. L. (2005). *Salmonella* infection risk associated with outdoor organic pig production (oral presentation). pp 87-93 *In* M. Hovi, M Walkenhorst and S. Padel (eds) *System development: quality and safety of organic livestock products.* Proceedings of the 4th SAFO Workshop 17-19 March 2005, Frick Switzerland.

Jensen, Annette Nygaard and Baggesen, Dorte Lau (2004) Spread of salmonella in organic pigs. *Newsletter from Danish Research Centre for Organic Farming*(4). Online at <http://www.darcof.dk/enews/dec04/salmonella.html>

Jensen, A.N. (2004) Fandt mange forskellige Salmonellatyper i forsøg med økogrise [Different salmonella types found in organic pig experiment]. In *Økologisk Jordbrug*, 24. december. December, No 327, page 6.

Jensen, A.N. and Baggesen, D.L. (2004) Salmonella bakterier kan spredes blandt økologiske grise [Salmonella can spread between organic outdoor pigs]. *FØJOenyt*(6). Online at <http://www.foejo.dk/enyt2/enyt/dec04/salmonella.html>

Jensen, A.N. and Baggesen, D.L. (2004) Salmonella og Campylobacter i økologisk svineproduktion [Salmonella and Campylobacter in organic pig production]. FØJO II Brochure.

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

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