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FOOD SAFETY AND "ANIMAL FRIENDLY" PRODUCTION: IS THERE A CONFLICT OF INTERESTS?

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Summary

"Animal friendly" production systems differ from traditional production in the use of bedding, more contact among animals, and outdoor access. However, there is a potential of these properties to impair the safety of foods from animal origin. For milk, pork and poultry, microbiological quality was compared among traditional production and products labelled as "animal friendly" production. Bulk milk bacteria counts were recorded monthly from 129 dairy farms over 24 months. Seventy-eight milk samples were cultured bacteriologically and results compared among traditional tie stalls, tie stalls providing regular exercise in an outdoor yard, and free stalls with regular exercise outdoors. Total bacteria counts were slightly lower in loose housing systems than in tie stalls, whereas spores from anaerobic bacteria were more frequent in farms with outdoor access. Faecal samples from 88 swine fattening farms, and 865 pork samples were cultured for Campylobacter, Salmonella, and Yersinia. There was no difference in the prevalence of these zoonotic bacteria among traditional indoor farms with slatted floor pens, and farms providing straw bedding and an outdoor yard. Samples from 98 poultry farms and 415 poultry meat samples showed a higher prevalence of Campylobacter in free range production compared to traditional indoor farms. Overall, it could be shown that except for poultry production, there was no negative impact of "animal friendly" production on microbiological food quality.

Key words: swine, cattle, poultry, husbandry system, microbiological food quality

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Introduction

Consumers' demand for food produced in "animal friendly" production systems has been increasing in recent years. For farmers, there are financial incentives to produce in "animal friendly" systems. On the one hand, retailers pay a premium on the price for these products, on the other hand there are governmental subsidies for housing and management systems that are especially adapted to the needs of the animals. In Switzerland, 61% of dairy cows, 49% of fattening pigs, and 27% of poultry were kept in farms receiving governmental subsidies for providing regular access to outdoor facilities to their animals in the year 2001 (Swiss Federal Office for Agriculture 2002).

Because "animal friendly" production systems are relatively new, there is little information available on their effect on food quality. The use of bedding material such as straw, and increased contact to the environment due to outdoor access might increase the risk of bacterial contamination of milk, or infection of animals with zoonotic bacteria. The results of three research projects comparing the microbiological quality of food produced in "animal friendly" and traditional production systems for dairy cattle, pigs, and poultry are presented.

Materials and methods

In the year 2000, a study on milk quality was performed on 129 dairy farms (Regula et al. 2002). Bulk milk bacterial and somatic cell counts were recorded monthly over a two-year period. In addition, bulk milk samples from 78 farms were cultured bacteriologically. Results were compared among traditional tie stalls with minimal outdoor access, tie stalls providing regular exercise in an outdoor yard, and free stalls with regular exercise outdoors.

From May 2001 to November 2001, a cross-sectional study was performed on 88 finishing pig farms with either traditional indoor housing in slatted floor pens or "animal friendly" production with straw bedding and outdoor access (Ledergerber et al. 2003). From each farm, twenty faecal samples from market-weight finishing pigs were collected and combined into four pooled samples (Stege et al. 2000). From 283 retailers across Switzerland, 449 raw pork products from "animal friendly" production, and 416 products from traditional production were collected. Pooled faecal samples and meat samples were cultured for *Salmonella* species, thermophilic *Campylobacter* species, and *Yersinia enterocolitica.*

In 2002, three housing systems for poultry production were compared; (1) traditional floor keeping, (2) floor keeping with natural daylight, activity and rest areas with perches, and an external climate area (conservatory) strewn for dust baths, and (3) free range systems with daily access to a meadow. From a total of 98 poultry flocks, cloacal swabs were collected at the beginning of the slaughter line, and neck skin samples were taken at the end of the slaughter line. Flocks were randomly selected from two large abattoirs representing 80% of the Swiss poultry production. Five birds per flock were sampled at each sampling point. At retail, a random sample of 415 poultry meat samples was collected. Samples were cultured for thermophilic *Campylobacter* spp., and the prevalence was compared among the three housing systems.

Results

Regular outdoor access had little effect on milk quality. When confounding factors were taken into account in a multiple regression model, somatic cell counts were lower if cows went on pasture more frequently during the vegetation period (β=-0.19, $p<0.001$). Bacteria counts were lower in free stalls than in tie stalls (β=-0.32, $p<0.001$). Spores from spore forming bacteria were more frequent in farms that let the animals outside regardless of weather conditions (OR=5.9, p=0.01). For the other bacteria groups, no significant differences among housing systems could be observed.

No significant differences were found for the prevalence of zoonotic pathogens in "animal friendly" and traditional pork production. For pooled faecal samples collected from finishing pigs, 0.5% of samples from "animal friendly" farms, and 2.4% of samples from traditional farms were positive for *Salmonella* spp. The prevalence of *Campylobacter* spp. was 93% in "animal friendly" farms, and 90% in traditional farms, while *Yersinia enterocolitica* was present in 36% of samples from 'animal friendly', and 40% of samples from traditional farms. All meat samples were negative for *Salmonella* spp. *Campylobacter* spp. was isolated from one meat sample labelled as 'animal friendly', and one meat sample from traditional production, respectively. The prevalence of yersinia in meat samples was 15%, with no difference in prevalence among housing systems. Ninety percent of the yersinia strains isolated from meat were identified as biotype 1 a, which is not pathogenic to humans.

In poultry, the prevalence of *Campylobacter* spp. was highest in free range systems, and lowest in floor keeping with external climate area. Forty-three percent of cloacal swabs from traditional floor keeping were Campylobacter

positive, compared to 26% of samples from floor keeping with external climate area, and 54% of samples from free range systems. For neck skin samples, the prevalence was 25% for traditional floor keeping, 14% for floor keeping with external climate area, and 27% for free range systems. In poultry meat samples, the prevalence for the three production types was 20%, 10%, and 29%, respectively.

Discussion

For milk and pork production, the microbiological quality of food produced in "animal friendly" production systems was equal to that of products from traditional intensive production. If a good hygiene and farm management is maintained, it is possible to achieve a high standard of microbiological food quality, as well as a high ethical quality in terms of "animal friendly" production.

In poultry production, access to pasture was associated with a higher prevalence of *Campylobacter* spp. Alternative husbandry systems such as floor keeping systems with external climate area but no outdoor access will need to be considered as a compromise between optimal animal welfare and optimal food safety.

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SIGURNOST HRANE I "ŽIVOTINJAMA NAKLONJENA" PROIZVODNJA: POSTOJI LI SUKOB INTERESA?

Sažetak

"Životinjama naklonjeni" sustavi proizvodnje razlikuju se od tradicionalne proizvodnje u upotrebi stelje, više povezanosti među životinjama i pristupu otvorenom prostoru. Međutim, postoji mogućnost da ova svojstva ugroze sigurnost hrane životinjskog podrijetla. Mikrobiološka kakvoća mlijeka, svinjetine i mesa peradi uspoređivana je u tradicionalnoj proizvodnji i proizvodima označenim "životinjama naklonjena" proizvodnja.

Na 129 mliječnih farma mjesečno je kroz 24 mjeseca bilježen broj bakterija u mlijeku. Obavljena je bakteriološka kultura 78 uzoraka mlijeka a rezultati su uspoređivani između tradicionalnog vezanog držanja, vezanog držanja s redovitim boravkom na otvorenom dvorištu, te slobodnog držanja s redovitim boravkom na otvorenom. Ukupan broj bakterija bio je nešto niži kod sustava slobodnog držanja nego kod vezanog držanja, dok su spore anaerobnih bakterija bile češće na farmama s držanjem na otvorenom.

Nasađena je kultura fekalnih uzoraka s 88 farma za tov svinja i 865 uzoraka svinjetine na Kampilobakteriju, Salmonelu i Jersiniju. Nije bilo razlike u prevladavanju ovih zoonotičkih bakterija između farma s tradicionalnim držanjem u zatvorenim boksovima s rešetkastim podom i farma koje su imale stelju od slame i otvoreno dvorište. Uzorci s 98 farma peradi i 4-15 uzoraka mesa peradi pokazali su veću pojavu kampilobakterija u proizvodnji na slobodnom u usporedbi s tradicionalnim farmama sa zatvorenim držanjem.

Općenito se može reći da osim u peradarskoj proizvodnji nije bilo negativnog djelovanja "životinjama naklonjene" proizvodnje na mikrobiološku kakvoću hrane.

Ključne riječi: svinja, govedo, perad, sustav uzgoja, mikrobiološka kakvoća hrane

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