

A comparison of lesions found during meat inspection of finishing pigs raised under organic/free-range conditions and conventional indoor conditions

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Abstract

We compared the results from meat inspection of organic/free-range finishing pigs versus conventionally-raised pigs. Data covered a period of 1 year and were collected from one abattoir in Denmark. In total, there were 201,160 organic/free-range pigs and 1,173,213 conventionally raised pigs. Over-all speaking, there was an equal number of lesions recorded in the two kinds of production systems. The majority of the lesion types were recorded infrequently (<4%). Only chronic pleuritis was a common finding in both types of production systems. A total of 13 lesion types were more frequent among organic/free-range pigs than among conventional pigs - among others old fractures, tail lesions and osteomyelitis. Four lesion types were equally frequent in the two groups: chronic pneumonia, chronic pleuritis, fresh fracture, and abscess in head/ear. Four lesion types were recorded less frequently among organic/free-range pigs compared with conventionally raised pigs. These included abscess in leg/toe, hernia and scar/hock lesion. Possible associations between the individual lesion types and the production systems - including the requirements for each system - are discussed. The results emphasize the importance of using direct animal based parameters when evaluating animal welfare in different types of production systems. Moreover, individual solutions to the health problems observed in a herd should be found, e.g. in collaboration with the veterinary practitioner and other advisors.

Introduction

It is often argued that pigs raised under less intensive production conditions – such as organic or free-range – have a higher level of animal welfare compared with conventionally raised pigs. To look into this, an analysis of data from a large Danish abattoir slaughtering organic, free-range, and conventionally raised finishing pigs was undertaken. In Denmark, pig production plays a substantial role, representing an export value of €4.3 billion out of a total of €82.7 billion. The largest Danish abattoir company is Danish Crown. Almost all pigs raised under special animal welfare contracts in Denmark are slaughtered in one specific plant owned by Danish Crown. The company “Friland A/S”, owned by Danish Crown, has special contracts with farmers, who raise pigs according to the rules set for organic pig production (Friland økologiske svin) or the rules set for “Frilandsgrisen” which deals with non-organic outdoor production. The pig genetics are similar in these two types of production systems as well as in the conventional production, and almost all male pigs are castrated.

Material and Methods

In Denmark, finishing pigs are subjected to *ante mortem* and *post mortem* inspection at the abattoir performed by a specially trained inspector – a veterinarian or a technician. Hence, every slaughter animal is inspected according to the current meat inspection circular, and lesions found during the inspection are recorded electronically. One common coding system with more than 70 codes is in use at all Danish abattoirs (Anonymous, 2011). Data covered a period of 1 year and were collected from one abattoir slaughtering organic, free-range and conventional pigs. They comprised 201,160 organic/free-range pigs

and 1,173,213 conventionally raised pigs. The pigs originated from 54 organic herds, 117 free-range herds, and 789 conventional herds. The number of times a given type of lesion was recorded as well as the total number of pigs inspected was given. Recordings that did not reflect pathological lesions were excluded, e.g. recordings due to lack of slap mark, colored skin, lack of ear tag, slaughter error, and contaminations. First, the prevalence of each individual type of lesion was calculated. It was ignored that one pig could be observed having more than one lesion type. Hence, the results reflect the intensity of recordings in each of the two types of production systems. All types of lesions occurring with a prevalence above 0.1% among the organic/free-range or conventionally raised pigs were included in the analyses. This corresponded to 99.4% of the recordings among organic/free-range pigs and 99.0% of the recordings among the conventional pigs. However, the lesion pyemia was included although the prevalence was lower than 0.1%, because acute pyemia results in total condemnation of the carcass. Next, a statistical comparison between the prevalences in organic/free-range and conventional pigs was undertaken. Because of the large number of data, the P-value for significance was lowered to $P=0.001$, and only biological associations reflecting Odds Ratios greater than 1.2 or less than 0.8 were considered to be of significance. Moreover, the requirements for each of the three types of production systems were investigated by studying relevant rules and legislation as well as contacting the abattoir company.

Results

An initial comparison of the prevalence of the total of all lesions did not reveal any differences between organic/free-range (39.4%) and conventional production (39.1%). However, when chronic pleuritis was subtracted from the total number of lesions, a difference was observed; the prevalence of lesions in organic/free-range production was 20.3% compared with 15.2% in the conventional production (OR=1.3, $P<0.0001$). The majority of the lesion types were recorded infrequently (<4%). Only chronic pleuritis was a common finding with a prevalence of 19% among organic/free-range pigs and 24% among conventional pigs. A total of 13 lesion types were more frequent among organic/free-range pigs than among conventional pigs - among others old fractures, tail lesions and osteomyelitis. Four lesion types were equally frequent in the two groups: chronic pneumonia, chronic pleuritis, fresh fracture, and abscess in head/ear. Four lesion types were recorded less frequently among organic/free-range pigs compared with conventionally raised pigs. These included abscess in leg/toe, hernia and scar/hock lesion. The evaluation of the requirements to the different types of production systems showed that there were several differences related to, among others, the use of outdoor huts for farrowing sows, weaning age, restriction on use of antimicrobials, withdrawal time related to use of antimicrobials, stocking density, flooring and the use of bedding. On top of the ordinary price paid by the slaughterhouse company, the farmer also receives a premium for organic pigs and free-range pigs, respectively. In the first quarter of 2014, the premium for an average organic carcass with a weight of 84 kg was €113.7 and for a free-range carcass with a similar weight, €24.5.

Table 1

Prevalence of lesions recorded during meat inspection in organic/free-range finishing pigs (N=201,160) compared with conventionally raised finishing pigs (N=1,173,213), for one Danish slaughterhouse, covering 1 year from October 2012 to September 2013, ranked by Odds Ratio

Lesion type	Prevalence (%)		Odds Ratio	P-value for comparison
	Organic/free-range	Conventional		
HIGHER RISK*				
Healed rib fracture	0.73	0.19	3.8	<0.0001
Eczema/insect bite	2.41	0.73	3.4	<0.0001
Tail lesion – local	2.37	0.76	3.2	<0.0001
Chronic infectious arthritis	0.87	0.27	3.2	<0.0001
Milk spotted liver	2.60	0.90	3.0	<0.0001
Old fracture	0.20	0.09	2.2	<0.0001
Osteomyelitis	0.34	0.16	2.1	<0.0001
Tail lesion/tail infection	0.18	0.09	2.0	<0.0001
Skin corrosion	0.10	0.06	1.8	<0.0001
Abscess in mid-part	0.47	0.30	1.6	<0.0001
Abscess in hind part	1.30	0.82	1.6	<0.0001
Chronic peritonitis	1.11	0.74	1.5	<0.0001
Chronic pericarditis	1.67	1.32	1.3	<0.0001
EQUAL RISK*				
Chronic pneumonia	0.35	0.30	1.2	0.0006
Abscess in head and ear	1.81	1.90	0.9	0.0039
Fresh fracture	0.13	0.17	0.8	<0.0001
Chronic pleuritis	19.06	23.94	0.8	<0.0001
LOWER RISK*				
Abscess in leg/toe	0.74	1.03	0.7	<0.0001
Hernia	0.93	1.36	0.7	<0.0001
Pyemia	0.01	0.02	0.5	0.0007
Scar/hock lesion	1.47	3.41	0.4	<0.0001

*: Biological significance assessed at OR>1.2 or OR<0.8. Statistical significance only assessed at P<0.001.

Discussion

This is the first time that a large dataset has been investigated allowing a deeper comparison between the various lesions found during meat inspection of organic/free-range finishing pigs and conventionally raised finishing pigs. However, the data structure only allowed a calculation of the over-all prevalence of each lesion recorded within each type of production system (organic/free-range versus conventional) and a subsequent comparison of these prevalences between production systems. Hence, it was not possible to distinguish between organic and free-range. This restriction was imposed to ensure the privacy of the farmers. Unfortunately, it also limited the statistical analysis and made it impossible to identify to which extent the variation observed in the prevalence of the individual lesions was caused by the individual herd. In other words: the identified differences might be ascribed to a limited number of the organic/free-range herds that have problems. On the other hand, this abattoir slaughters the main part of Danish, organic/free-range pigs as well as more than one million conventionally raised finishing pigs. Hence, the results obtained are not representing a sample of pigs taken from a limited number of organic or free-range herds.

We suggest that the higher occurrence of a number of lesions observed during meat inspection of

organic/free-range pigs can be linked to the following factors:

1. A higher level of tail biting, probably related to the pigs having intact tails, and causing tail lesions and the development of pyemic processes in the pigs
2. Limited all-in all-out management (batch management) and poorer hygiene, which increases the risk of transmission of infectious diseases among pigs of different age groups and the survival of pathogens in the pen environment
3. A moist/wet floor in parts of the pen, possibly because solid (non-slatted) floors are used to a higher extent than in conventional production, and
4. Squeezing by the sow during the suckling period because the piglets are born in outdoor huts where the movement of the sows is not restricted by farrowing crates.

Moreover, it may be more difficult to detect a sick pig early in the disease course in organic and free-range production compared with conventional production because of differences in housing. In organic and free-range production, the pens are often large and the pigs may be outdoors, making it difficult to see all animals. Furthermore, it is possible that there is a reluctance to use antimicrobials, in particular in organic production and to some extent maybe also in free-range production. This will influence the occurrence of most of the lesion types caused by bacterial infections in these production systems. The lower risk of lesions on the limbs in organic/free-range pigs suggests a beneficial effect of the use of solid floors and the use of bedding. For a full discussion of all differences found please see Alban *et al.* (2015).

Conclusion

Organic and free-range finishing pigs show different disease patterns when meat inspection data are compared. These differences are probably related to the production and management. The results emphasize the importance of using direct animal based parameters when evaluating animal welfare in different types of production systems. Moreover, individual solutions to the health problems observed in a herd should be found, e.g. in collaboration with the veterinary practitioner and other advisors.

Epilogue

After the publication of this work, it has been decided to organize a workshop for pig farmers involved in organic or free-range production. The aim of the workshop is to discuss how to further improve the health of the pigs e.g. by focusing on the importance of identifying sick animals early in the disease course and providing them with the right treatment.

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Acknowledgements

The slaughterhouse company is acknowledged for making the data available for the analysis.

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