

WELFARE OF ANIMAL PRODUCTION IN INTENSIVE AND ORGANIC SYSTEMS WITH SPECIAL REFERENCE TO DANISH ORGANIC PIG PRODUCTION

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Abstract

Although organic meat production is only a small proportion of the total meat production in the EU, it is increasing in size to take the demands of certain market segments into account. Organic production standards vary according to organisation within countries but all must as a minimum fulfil EU legislative requirements. There is a greater potential for optimal welfare in organic systems compared to intensive systems, as the management of farm animals must take into account their physiological, social and behavioural needs. However, demands on management are greater in organic systems, particularly if these are free range, and concern has been expressed regarding animal health. Vaccinations, antibiotics and antihelmintics may only be used in a limited way in organic production and the use of natural and homeopathic products, whose efficacy has not been scientifically documented, must take precedence over veterinary medical products. Legislative requirements regarding the pre-slaughter handling of organic slaughter animals are essentially the same as for all other animals. In Denmark, ethical audits for documenting pig welfare during collection at the farm, during transport and at the abattoir have been proposed and tested on the initiative of the Pig Committee under the Association of Organic Meat Producers in Denmark. It is the hope of the Committee that these audits will be used within the EU to ensure optimal welfare for organic pigs in the pre-slaughter period.

Keywords: organic meat production, welfare, auditing, pre-slaughter handling of pigs

Introduction

In recent years consumers have become more and more focussed on the way that food is produced and the increasing intensification of farming has been perceived as a negative development. In animal production, intensive farming is seen as compromising the welfare of the animals and the perception is that there is widespread use of synthetic chemicals, both in medication and growth promoters and as feed components. In plant production, intensive farming is seen as compromising the environment with far too much use of fertilizers, pesticides and herbicides. The products from both animal and plant production are seen by many as being polluted with residues of various kinds. Organic farming is carried out in such a way that production is environmentally friendly and moreover takes animal needs into account, and hence addresses many of the concerns that consumers have with intensive production. A recent survey carried out by the Danish Statistical Services (2001) confirmed that environmental and welfare aspects were of primary importance for Danish consumers. In 2001, welfare was on the same level as environmental aspects and higher than health and eating quality (Table 1).

It would have been advantageous to look at organic animal production in Europe and the different emphasis that various European countries place on this type of production. However, for various reasons, statistics on the extent of organic meat production are not generally available for EU-countries. Danish figures published by the Plant Directorate (2000) and the Danish Statistical Services (2000) can, however, be used as an illustration, as these are national averages (Table 2). These figures show that the extent of the production is very small compared to the total production for pigs and poultry. Just over 9 % of Danish cattle were organic in 2000, but this was mainly due to dairy animals used for milk and cheese production. The consumption of organic milk in Denmark was 26% of the total in 2000 and this is expected to increase to 30 % this year. The percentage of organic cattle for beef production is estimated to be between 1 and 2% of the total beef and veal produced in 2000. The percentage of organic sheep was also relatively high but this must be seen against the background of the size of this production in Denmark, which is very small compared to European standards.

Irrespective of species, organic production has increased enormously in Denmark since the middle 1990's. For example, the number of organic pigs slaughtered in 1994 was about 2,500. This year the figure is over 100,000, an increase of over 4000 %. The corresponding figures for cattle were 1,800 and about 12,000 head.

The aim of this talk will be to discuss the welfare aspects of organic and intensive productions with particular reference to Danish organic pig production and I will describe new developments in the pre-slaughter handling area that are presently being considered.

Welfare perceptions

It should be pointed out that there are variations in the emphasis that consumers put on the welfare of animals, when they buy meat. Some do not consider welfare at all, whereas others have certain requirements that vary according to their particular perception as to what is good welfare. Public debate in the on-farm area has concentrated on intensive systems, i.e. production systems with full environmental control, high stocking rates, fully slatted flooring, no straw bedding and limited contact with stock persons and these are perceived as unacceptable by an increasing percentage of the public. In 1986, Webster, Saville and Welchman listed five "freedoms" that are essential for avoiding animal welfare problems:

- freedom from hunger and malnutrition
- freedom from thermal or physical stress
- freedom from disease and injury
- freedom to express most normal behaviour patterns
- freedom from fear

Of these, it is the freedom for animals to express natural behaviour patterns that has mainly been criticised in intensive systems, where the barren environment does not allow animals to express many typical behaviours. The transport of animals over long distances under poor conditions, and to a lesser extent the way animals are treated and slaughtered, has also been criticised by some consumers.

Public perceptions regarding welfare in intensive and extensive systems are, however, far too simplistic and the situation is complicated by trade offs between different aspects (Rushen and de Passillé, 1992). There are welfare advantages and disadvantages in both intensive and extensive systems. Extensive systems give animals the possibility of showing natural behaviours, but environmental control is more difficult, as is control and treatment of animals for disease. Animals may suffer from aggression and dominance. Intensive systems restrict the natural behaviour of animals and sometimes lead to behavioural problems and aggression but they have good environmental control and easy access to animals for controlling disease and treating individual animals. Stalled animals can avoid aggression and social stress. Optimal feeding is

also easier in intensive systems. Irrespective of system, management is an important factor in maintaining good welfare. Well managed intensive systems can actually be better welfare wise than poorly managed extensive systems.

History of organic farming

The present organic concept is based on several philosophies and the development of a number of different alternative agricultural systems that have mainly occurred in Northern Europe since the beginning of the 20th century. There are three main movements that are the forerunners of present day organic production and they have all been inspired by philosophical ideas and affected by the economic and political situation in the various countries concerned.

The first movement occurred in Germany and was inspired by Rudolf Steiner. It was based on a philosophical theory that he developed in 1913. Biodynamic farming was developed by his disciple, Pfeiffer, and emphasized a balanced and healthy nutrition that was connected to a number of different basic principles of organic farming, such as rejection of soluble mineral fertilizers and the autonomy of the farm, which was attained via rotational cropping and the use of animal manure. This system also had a cosmic dimension and emphasized the influence of the phases of the moon and stars on crops.

Organic farming started in England after the Second World War and emphasized biological equilibrium and the fertility of the soil. The use of composted organic compounds was important and was thought to play an important role for the resistance of plants to pests and diseases. These ideas were further developed with observations from India and formed the basis for the Soil Association, who emphasize natural agricultural practices that protect the environment.

Finally, there was a third movement which occurred in Switzerland in the 1940's. This movement stressed that farms should be self-contained and that the route from farm to consumer should be as short as possible. Moreover, there should be the greatest possible use of renewable resources and the humus content of the soil should be protected via surface composting and the least possible disturbance to soil to protect its microflora.

As could be expected from its various origins there are variations in the definition of organic production within Europe and we are not talking about a homogeneous entity. Even within countries, there can be many different organisations, each with their own definition of just what constitutes organic production, each with their own logo and in many cases each with their own auditing system. Denmark is an exception here, as all organic production is run under a national scheme with a national logo, that is audited by the Plant Directorate, so that consumers are only confronted with a single system, when buying organic products in shops. Germany has recently introduced a nationwide system, AGÖL, but this is not yet accepted by all organic groups within the country (World Organic News, 2001). As a result of these variations in standards, it has been necessary to agree to certain minimum standards in EU countries, that must be fulfilled in all. Member countries can, however, in addition, include other demands that they find important.

Legislation

The first EU legislation (Council Regulation 2029/91) was approved with the aim of standardising conditions in EU countries and ensuring that consumers were guaranteed products that fulfilled certain minimum specifications. This legislation has been amended several times, most recently by Commission Regulation No 436/2001 to clarify certain areas, particularly in the annexes.

EU legislation states that the management of farm animals must take into account their physiological, social and behavioural needs and be carried out in a "natural" way. Among other things the following must be included:

- no systematic operations on animals may be carried out that can cause pain or discomfort, unless these are strictly necessary for safety or other reasons.
- natural movement patterns of the species concerned must be taken into account.
- with certain exceptions no animal must be tied.
- stocking rates must ensure animal comfort and well-being but if outdoors must not damage the environment.
- group sizes must be appropriate for the species and age/sex of the animal concerned and not have any negative effect on welfare.
- indoor lying areas must have sufficient clean straw, good ventilation and daylight.
- outdoors there must be sufficient shade and protection from inclement weather.
- all animals must be able to have daily exercise all year round.
- herbivores must have access to grass whenever conditions allow this.
- pigs and poultry must have daily access to roughage.

On the basis of these general statements, the legislation gives a number of specific requirements for the individual species, *i.e.*, for cattle, sheep, pigs, broilers, ducks, turkeys, geese, and egg laying hens.

It is clear from this general description that there is a greater potential for optimal welfare in organic systems than in intensive systems. However, as mentioned previously, management is important for an optimal result and the demands on management are probably greater in this kind of system than in intensive systems. In addition, concerns have been expressed regarding animal health. Seifert, Seifert and Beutling (2002) showed that only 10% of free range pigs produced under similar conditions to organic pigs had lesions at slaughter corresponding to pneumonia compared to 41% of intensively raised pigs. However, 38% of free range pigs were afflicted by endoparasites compared to none in the conventional system. Hammarberg (2001) and Hämeenoja (2001) both focussed on management of animal health care, where vaccinations, antibiotics and antihelmintics may only be used in a limited way in organic production. Specifically, the legislation recommendation that phytotherapeutic essences and homeopathic products should take precedence over the so-called chemically synthesised allopathic veterinary medical products causes welfare problems in some countries, where veterinarians are not allowed to use alternative methods and where the scientific basis for the use of such methods is lacking.

Pre-slaughter handling

Whereas there are many and detailed requirements regarding welfare during the fattening period, EU legislation requires only that transport and treatment at the abattoir should be carried out in such a way as to reduce stress, as far as possible. Specifically, no electric goads should be used when on- and off-loading animals from transport vehicles and for pigs no tranquillisers must be used immediately before transport. Essentially, therefore, the minimum requirements for transport and slaughter of organic animals is as for conventional animals. Danish legislation (and other organic systems in other countries) goes further than this and makes certain demands regarding the standards of transport vehicles as well as to the treatment during transport and at the abattoir.

The Pig Committee under the Danish Association of Organic Meat producers was not satisfied with this situation and in the Autumn of 1999 began a collaboration with the Danish Meat Research Institute to develop an ethical audit for the pre-slaughter handling of organic pigs. This was to be based on the principles used in the audit developed for conventional pig abattoirs (unpublished work by Barton Gade, Blaabjerg and Vorup, 1997) but was to be extended, so that treatment during movement from farm pens and collection at the farm as well as the transport itself was to be included. As with the audit developed for conventional abattoirs, the audits to be developed were to be endorsed by the Danish Society for the Protection of Animals, so that the welfare level reflected that of concerned Danish society. Organic pigs in Denmark can be raised outdoors or indoors, they can be transported by professional hauliers or by the farmers themselves, and they can be slaughtered at small or large abattoirs and the audits had to take this wide range of treatments into account.

Development of the Ethical Audits

First the Pig Committee decided the basic criteria for optimal welfare during collection, transport and treatment at the abattoir that must be fulfilled, regardless of the system to be used. Seven criteria were chosen:

- voluntary forward movement
- as little force to be used as possible
- no goads
- physical needs to be fulfilled
- no mixing of unfamiliar animals
- no injuries
- prompt treatment in the event of injury etc.

Then, for each of the areas, collection, transport and treatment at the abattoir, the elements that could affect the above basic criteria were established. Treatment at the abattoir was divided into sub-areas for convenience. The number of elements is not necessarily the same within collection at the farm, transport and at the abattoir or between farms, hauliers and abattoirs. It all depends on the type of system used, as will be illustrated below. However this means that it is not possible to compare systems, only to see how well a given system fulfils the basic criteria that the Committee has decided upon.

For each of the elements, a description was given of what the Committee considered to be an ideal treatment, an acceptable treatment, an incorrect treatment and an unacceptable treatment (given points 1 to 4 respectively). It is this subjective evaluation that is carried out by assessors. The sub-areas within each element were then weighted according to importance (1 = less important, 3 = important and 6 = very important). Both the description of ideal to unacceptable treatment and the weighting according to importance were approved by the Danish Society for the Protection of Animals. Finally, an economic dimension was added that took into account whether investments were necessary to put things right (1 = costs involved, 2 = no costs involved). In this way areas that cost nothing to change weighed twice as much in the audit as areas, where greater or lesser investments were necessary. All these evaluations and weightings were then multiplied by one another, divided by the result for the worst possible treatment (all subjective evaluations = 4) and the total obtained subtracted from 100. As with the original audit developed for conventional abattoirs, it was decided that subjective gradations of 1 or 2 (ideal and acceptable) were not weighted in the audit, so that the final result compared a given treatment with an acceptable level rather than the ideal one.

This method means that the treatment in each sub-area and the treatment as a whole is given as a percentage in relation to acceptable welfare level. The closer the figure is to 100, the better the welfare has been. The results make it clear to a farmer, haulier or abattoir where there are problem areas that need to be put right and shows clearly what elements need to be improved in the short and long term. The Pig Committee decided that the final result should lie as close as possible to 100% and must be a minimum of 80 % before they considered the welfare level of organic pigs to be acceptable. Moreover, if legislative requirements were not fulfilled, then the treatment is deemed unacceptable irrespective of total percentage gained.

Testing the auditing system

The proposed audits were then carried out for Committee members, their hauliers and abattoirs to see if adjustments were necessary.

Producers: There were five producers, three of whom were small and used a free range system. Two were large producers, who used indoor systems with access to an outdoor area. Collection of free range pigs occurred out in the field either by enticing them into a trailer using feed or by shutting them in the hut early in the morning. Both large producers had an outdoor delivery area to which pigs for collection were transferred the evening before.

The results (Table 3) showed that 4 of the 5 producers could fulfil the minimum standards and that the fifth was close to 80 %. All producers had an excellent treatment of the pigs during separation from their pen mates and movement to the collecting area, and unfamiliar animals were never mixed. Low scores were mainly given as a result of poor design of the collection area.

Transport: Two of the free range producers transported their own pigs in a trailer a short distance to the abattoir (P1 = 5 km, P5 = 500 m). Pigs from all other producers were collected in the same commercial double-decked vehicle that fulfilled Danish regulations for transport vehicles to be used for organic pigs, i.e., full air suspension on all axles, tail gate lift, mobile deck, rubber flooring in the vehicle and lift as well as ventilation openings along both sides of the vehicle at pig height and mechanical ventilation. For transport it was not possible to make one audit for all, as short transports of a few animals by the owner do not need as stringent a system as longer commercial transports with many animals. In Table 4 the audits are nevertheless shown together and sub-areas that are not valid for shorter transports are shown with a dash.

One of the farmers transporting his own pigs fulfilled the minimum level required by the Committee, whereas the others did not. The elements in the transport audit are mainly focussed on the technical aspects of the vehicle used and investments will be necessary before the minimum levels required by the Committee can be attained.

Treatment at the abattoir: Pigs from P1 and P5 were slaughtered at abattoirs 3 and 1 respectively. Both abattoirs were small with slaughter rates of 5-7 pigs per hour, and both used electrical stunning, one with cardiac arrest (A1) and one reversibly (A3). Pigs from all other producers were slaughtered at abattoir 2, which was a large abattoir that used the group stunning system based on CO₂ and a slaughter rate of 400 pigs per hour.

Two of the abattoirs could fulfil the minimum level required by the Pig Committee and the value attained at the large abattoir was the highest ever achieved for an ethical audit at abattoirs (Table 5). The group stunning system was especially developed to maximise animal welfare before stunning, specifically to eliminate the need for electrical goads and the audit shows that this goal has been successful. All abattoirs had an excellent treatment from off-loading to stunning, although water was not available for pigs during lairage at A3. Stunning at the

smaller plants was less satisfactory and for A3 was directly unacceptable. This plant needed to upgrade its stunning equipment before approval could be attained.

The audits are now being finalised on the basis of these tests and it is the hope of the Pig Committee that they will be implemented in practice in Denmark and hopefully in other countries too. Ethical audits are not static and can be modified to take changing consumer demands into account. However, the methodology shown above can always be used via changes to the basic criteria and the subjective evaluations.

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Table 1. The reason for Danish families buying organic products, %

	Extremely important	Very important	Slightly important	No importance	Don't know
Environment					
- 2000	27	44	15	13	1
- 2001	38	33	13	15	1
Animal welfare					
- 2000	25	43	16	15	1
- 2001	38	34	11	18	0
Health					
- 2000	21	38	19	21	1
- 2001	27	33	19	20	1
Eating quality					
- 2000	10	25	26	38	1
- 2001	14	21	22	43	0

Table 2 - Animals in organic production in relation to total production: Denmark 2000
Organic animals include those in the process of changing to organic production.

Animal species	Number of organic animals	Total number of animals	% organic
Cattle	174,388	1,891,000	9.2
Pigs	68,172	12,590,000	0.5
Sheep	12,507	145,492	8.5
Poultry: chickens	225,552	133,987,000	0.2
Poultry: Other	25,742	1,946,000	1.3

Table 3. Results of the ethical audit for producers

Producer 1: Free range, delivery 3 pigs; Producer 2: Indoor production with outdoor area, delivery 28 pigs.
 Producer 3: Indoor production with outdoor area, delivery 38 pigs; Producer 4: Free range, delivery 5 pigs.
 Producer 5: Free range, delivery 7 pigs.

Sub-area	Final result %				
	P 1	P 2	P 3	P 4	P 5
Fasting time	100	100	100	100	100
Catching	100	100	100	100	100
Floor area per pig	100	100	100	100	-
Mobile collection	-	-	-	-	-
Short term collection system	-	25	-	-	-
Long term collection system	-	-	0	0	-
Tatooning	0	25	100	100	100
Loading manner	100	100	100	100	100
Loading method	100	25	100	100	0
Noise level	100	100	100	100	100
Electrical goad	100	100	100	100	100
Group size	100	100	100	100	100
Mixing with unfamiliar pigs	100	100	100	100	100
Total result	91	77	91	91	96

Table 4: Results of the ethical audit for transport

Farmer transports are T 1 and T 3 from respectively P 1 and P 5. T2 transported pigs from P2, 3 and 4.

Sub-area	Final result %		
	T 1	T 2	T 3
Training	-	100	-
Lift	-	0	-
Flooring	0	100	0
Ventilation	100	100	100
Mechanical ventilation present	-	100	-
Mechanical ventilation usage	-	0	-
Suspension	-	100	-
Insulation	-	-	-
Protection against the weather	100	100	0
Compartment sizes	100	0	100
Showering	-	0	-
Floor space per pig	100	100	100
Total result	80	61	71

Table 5. Results of the ethical audit for treatment at the abattoir.

A1 and A3 are small and A2 a large abattoir.

Sub-area	Final result %		
	A 1	A 2	A 3
Arrival and off-loading	100	100	100
Movement to lairage pens	100	100	100
Lairage	88	91	75
Movement out of the lairage	100	100	100
Movement: lairage to crowd pen/area before stunning	100	77	80
Crowd pen/area before transfer to stunning	-	100	100
Race/ Transfer to stunning	-	100	-
Stunning and sticking	67	100	33
Handling of sick and injured animals	100	87	74
Training	0	0	0
Total result	88	93	76

The Commission has been working to improve the quality of life in the Community. It has been particularly concerned with the environment, education, and social services. The Commission has also been working to improve the efficiency of the public sector and to promote economic growth.

Category	1977	1978	1979	1980
Transport	100	100	100	100
Energy	100	100	100	100
Environment	100	100	100	100
Education	100	100	100	100
Social Services	100	100	100	100
Public Administration	100	100	100	100
Health	100	100	100	100
Research and Development	100	100	100	100
Industry	100	100	100	100
Small Business	100	100	100	100
Regional Development	100	100	100	100
Consumer Protection	100	100	100	100
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Environment	100	100	100	100
Education	100	100	100	100
Social Services	100	100	100	100
Public Administration	100	100	100	100
Health	100	100	100	100
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