

Possibilities and limitations of protein supply in organic poultry and pig production

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Abstract – Organic poultry and pig production has to face severe restrictions in the availability of feedstuffs of high quality protein. The objective of the project was to assess by meta-analysis of the literature whether the restrictions can be compensated by others measures without jeopardizing the goal of a high level of product- and process-related quality. Calculations showed that, in general, it is possible to formulate diets for poultry and pigs without the use of non-organic feedstuffs. However, there is a huge variation between farms on the local, regional or national level in their ability to provide organic diets. Several measures are outlined that are at the organic farmer's disposal to adapt to the restricted availability of high protein feedstuffs.

The risk of the occurrence of diseases and welfare problems in organic livestock production due to suboptimal nutrient provision by the farmer is comparably low, and can be handled by a proper management. Intensification of meat production, however, encloses a system-related increase in the risks of animal health disorders. From the animal health and welfare point of view, organic farming should be protected towards the negative side effects of an intensified meat production by setting limits with respect to the intensification process.¹

INTRODUCTION

The preferable use of home-grown feedstuffs and limitations in the choice of non-organic feedstuffs considerably reduce the availability of high quality protein in the nutrition of monogastric animals and restrict the possibilities for the adaptation of the protein supply to the specific requirements. Therefore, it is of special interest to evaluate whether nutritional imbalances encountered in practice might lead to a deterioration of product quality, animal health and welfare.

The objective of the research project was to discuss and assess by meta-analysis of the literature whether the restrictions can be compensated by others measures. These measures should be in accordance with the leading ideas of organic agriculture without jeopardizing the objectives of a high level of product- and process-related quality. The research work encompassed the production of broiler, turkey, laying hens and pigs.

CONVENTIONAL AND ORGANIC APPROACH

In organic livestock production the objectives of a land based system, the avoidance of specific means of production, and the priority of quality production rather than maximising production are of overriding importance. To deal with limited resources is therefore a main feature of organic livestock production. In contrast to conventional production, maximisation of protein accretion is only a subordinate objective. Differences in the priorities between conventional and organic livestock production and a comparison between the hierarchy related to their objectives are outlined in table 1.

Table 1. Differences in priorities between the conventional and organic livestock production system.

Conventional	Organic
i. Minimizing production costs	i. System-oriented production, based on land use, use of organic and home-grown feedstuffs
ii. Maximising productivity of farm animals	ii. Maximising efficiency within the whole farm system
iii. Maximizing carcass yield	iii. Optimising product and process quality (animal health and welfare, environmentally friendly production, naturalness)
iiii. Optimising single quality traits	iiii. Reducing production costs

RESULTS

Meta-analysis of the literature and the calculation of various diets related to the framework conditions of organic farming led to the following results.

Examples of feed rations based on 100 % organic feedstuffs indicate that, in general, it is possible to formulate diets for poultry and pigs without the use of non-organic feedstuffs. However, there is a huge variation between farms on local, regional or national level in their ability to provide organic diets.

Several measures are at the organic farmer's disposal to adapt to the restricted availability of high protein feedstuffs: implementation of multiple phase feeding, use of compensatory growth effects, the use of slow growing breeds and strains, reduction in the demand in relation to lean meat content, increase of feed intake by optimising feeding conditions, optimising housing conditions and therewith decrease protein requirements for immune challenges.

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Due to the restricted availability of feedstuffs with a high content of limited amino acids in the feeding of organic poultry and pig production, growth rates and protein accretion are clearly lower in organic compared to conventional production. Within the organic framework conditions different measures are at the farmers disposal to optimise the use of limited resources and to adapt the supply of limited amino acids to the growth process in the various stages of the animals. However, those measures are mainly characterised by increased efforts and expenditures in money and in working time. Thus, organic farmers are in no way competitive with the productivity in conventional livestock production.

Concerning product quality, reduced growth rates can function as an important precondition for a high level of eating quality of meat from monogastric animals due to the antagonistic relationships between traits related to performance and those related to eating quality. Thus, the lower growth rates in organic farming are a good starting point for high eating quality. However, eating quality of meat does not occur automatically when extensifying the production process but needs special management skills to balance the various relevant factors in a comprehensive approach. Therefore, organic farming can not per se claim to produce high eating quality products.

Concerning animal health and welfare problems in relation to nutritional imbalances, there is sound proof, that apart from animals in the first weeks of life, both poultry and pigs can compensate to a high degree for imbalanced feed rations without the onset of specific health and welfare problems. However, strains with a high genetic yield capacity seem to be more sensitive to suboptimal feed rations than slow growing strains or robust breeds. Within organic framework conditions, several measures are to the disposal of the farmer to prevent any harm deriving from nutritional imbalances.

On the other hand, in numerous studies the negative side effects of breeding for high protein accretion are described, especially in poultry production. Meanwhile, the prevalence of pathological findings and diseases in intensified production systems have reached to an alarming extent. While the risk of the occurrence of diseases and welfare problems in organic livestock production due to suboptimal nutrient provision by the farmer are comparably low and can be handled by proper management, intensification of meat production accepts a system-related increase in animal health disorders.

From the animal health and welfare point of view, organic farming should be protected towards the negative side effects of an intensified meat production by setting limits with respect to the intensification process. As the availability of high quality protein is the most relevant precondition for a high protein accretion, the limitation in feed availability seems to be a measure suited to restrict intensification. On the other hand, the obligation to use slow growing strains in the EC-Regulation seemed to have failed so far to provide the expected results, possibly due to a lack of control or suited control tools. Thus, the uncontrolled use of non-organic feedstuffs is expected to have a damaging effect on animal

health and welfare and on the confidence of those consumers who expect that organic products of animal's origin derive from healthy animals.

Concerning environmentally friendly production, organic farming generally includes a higher excretion of nutrients per product compared to conventional production due to more unbalanced feed rations especially in relation to the protein supply. However, on the farm level nutrient input into the farm and nutrient losses from the farm into the environment are clearly reduced compared to the high nutrient inputs in conventional production. Thus, organic livestock production can claim to be an environmentally friendly production method.

CONCLUSIONS

While conventional production is intended to reduce production costs by maximizing productivity with the use of external resources, it is a characteristic feature of organic livestock production to deal primarily with the limited resources within the farm system. Due to different objectives, management priorities and framework conditions, organic and conventional livestock production are characterised by completely different system approaches. Therefore, general conclusions derived from conventional production are not directly compatible and do not have the same meaningfulness and validity in organic livestock production.

Based on the knowledge derived from the meta-analysis it is possible and recommendable to avoid feed and protein sources of non-organic origin in the production of organic poultry and pigs without compromising animal health and welfare. Derogations for the use on non-organic feedstuffs could be restricted to young animals in the first weeks of life. Feed back measures, esp. farm gate feed balance sheets and animal health precaution plans should be integrated into the organic certification process to increase the level of animal health and welfare and to justify the confidence of the consumers in organic products.

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REFERENCES

The report is released on the website (www.organic-revision.org)