



OWC 2020 Paper Submission - Science Forum

Topic 3 - Transition towards organic and sustainable food systems

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FULFIL THE EXPECTATION OF 100% ORGANIC FEED TO ORGANIC PIGS AND POULTRY

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Abstract: To contribute to the goal of 100 % use of organic and regional feed for monogastrics, this paper aims to describe and discuss:

- · The protein requirement of monogastric animals (pigs and poultry), including different breeds, productions stages and rearing conditions
- · Nutrient contents and potential feeding values of new protein feedstuffs
- · Small-scale, on-farm equipment for feed processing
- · Different feeding strategies

When feeding pigs and poultry 100 % organic and regionally produced feed, securing enough protein and essential amino acids is a challenge. There are two strategies to follow and they can be combined. One is to utilize by-products, and explore new protein sources or refine already existing products. The other is to feed the animals less intensively and for this strategy slow-growing breeds will be useful due to a lower nutrient requirement. However, the possibilities for combinations of regionally grown feed, slow-growing breeds with different feeding strategies are many and they need to be explored.

Introduction: The EU transition to 100% organic feeding for organic livestock has been repeatedly postponed and is now expected to take effect from 2026. The postponement is due to the lack of organic protein resources found in the EU. The primary solutions implemented in order to meet the demands for organic protein with optimal amino acid composition for monogastric animals (pigs and poultry) are: (1) Efficient use of both commonly used and new protein sources. Examples of commonly used and new protein sources include cereals, legumes, roughage and other green biomasses, marine feed resources and by-products. (2) The minimization protein content in organic diets. From an economic and environmental aspect, it is important to minimize the protein content in organic diets. The protein requirements depend on e.g. animal breed, season and production state and can differ from the known requirements of conventionally reared farm animals.

The goal of this paper is to set up different possibilities to fulfil the requirements of protein and amino acids for organic pigs, broilers, and laying hens.

Material and methods: The content of this paper is based on a knowledge synthesis “Feeding monogastric 100% organic and regionally produced feed” (Studnitz,2019) produced as a part of H2020 Thematic Network called OK-NET EcoFeed. The knowledge synthesis is written to answer the needs for new knowledge to meet 100 % organic feeding, explored and identified by sixteen groups of farmers, advisors, feedstuff companies and other stakeholders from eight European countries (i.e., Great Britain, Spain, Italy, Serbia, France, Germany, Sweden, and Denmark). The groups, called Innovation Groups, were facilitated by members of the H2020 project, OK-Net EcoFeed, and were focused on either pigs (i.e., Great Britain, Spain, Serbia, France, Germany, Sweden), broilers (i.e., Great Britain, Italy, France, Germany, and Denmark) or laying hens (i.e., Great Britain, Italy, France, Germany, and Denmark).

In the autumn 2018, the local country-based Innovation Groups were asked to identify current challenges related to feeding regional, organic feed to monogastric animals. Further the Innovation Groups were asked to propose possible solutions to current limitations on producing regional organic feed.

The identified challenges and proposed solutions in the sixteen country-based Innovation Groups were discussed in three cross border Thematic Groups on respectively pigs, broilers and laying hens. Investigations and discussions resulted in a list of cross border knowledge gaps including increased understanding of: nutritional requirements at different life stages; plant nutritional content; alternative and novel feed sources and by-products, and the nutritional value of forage-based feed. In addition, more knowledge on local processing of feedstuffs was a need to know more about. In total 13 researchers both within the OK-Net EcoFeed-project and outside the project were invited to contribute to the knowledge gaps identified above. The researchers sent in their contributions to the knowledge synthesis in the period from November 2018 to February 2019.

Results: The answers to the knowledge needs of the farmers, advisors, feedstuff companies and other stakeholders in the Innovation Groups are divided into five topics:

Protein and Amino Acid Requirements of Animals and Content in Products and Refining known Products

a. **Protein and Amino Acid Requirements:** The protein and amino acid requirement for pigs, broilers and layers depends on breed, season, and production states; as an example, when analysing seasonal needs it is relevant to take climatic conditions (i.e., temperature, wind and humidity), availability and digestibility of grass or silage, and physical activity into account. All these aspects influence the nutritional requirement of animals; however, they are not yet being fully implemented in practice when formulating feed for organic animals.

b. **Protein and Amino Acid Content in New Protein Sources:** Sixteen uncommonly used feedstuffs (e.g., scraps of spelt pasta, waste from rice beverage, green protein, seaweed, starfish) are described with regard to nutritional composition (e.g., crude protein content (CP), amino acid profile, sustainability and competition with human food production.) As an example, green protein concentrate from grass and clover extracted by biorefining could be mentioned: the crude protein concentration of the extracted protein was 30-54 % in dry matter (DM) and feeding up to 12 % and 15 % of green protein concentrate can substitute other protein sources and be fed to laying hens

and growing pigs, respectively, without compromising productivity. Regarding sustainability, besides being a potential source of dietary protein, permanent pastures with grass-clover are characterised by a low level of nitrogen leaching compared to annual crops. Production of green protein competes less with production of food due to the relatively high DM and CP yields of permanent grass-clover compared to annual protein crops.

c. **Small-scale on-farm processing techniques:** Toasting is a heating process, which at the right temperature can make amino acids more available by degrading anti-nutritional factors. For de-oiling organic soya-beans, three processes are described: cold pressing, pre-toasting pressing and pre-extrusion pressing. Locally dried and fermented roughage is also described.

Alternative Feeding Strategies and slow growing animals

d. **Feeding Strategies:** When formulating feeding strategies for organic pigs and poultry it is important to take into account the characteristics of organic farming, (e.g., animals must have access to roughage and outdoor areas) and to consider these characteristics as important factors when meeting the animals' nutritional requirements with 100 % organic and regionally produced feed. Experiments on feeding strategies for growing pigs, sows, broilers and laying hens, (e.g., feeding roughage as feed, direct foraging in outdoor areas and phase feeding) are discussed.

e. **Slow growing animals:** Slow growing pigs, crossbreds of the traditional breed (Tamworth) and modern genotypes (Landrace and Yorkshire) showed increased grazing behaviour compared to modern cross bred, and slow growing poultry have showed ability to increase foraging activity if restricted in protein feed. Hence, some studies have shown that monogastrics perform well on feed with a lower protein content than recommended for a specific breed, if the animals can forage on grass and herbs or different crops as well as worms and insects in the soil, contributing with different nutrients to the animals.

Discussion: More precise protein and amino acid requirements are proposed for organic monogastrics, the content of protein and amino acids in by-product and new protein sources are listed, on-farm processing techniques, alternative feeding strategies are described and slow growing breeds more willing forage are discussed. To meet the EU transition to 100% organic feeding there are two ways to go and they can be combined. One is to utilize by-products and explore new protein sources or to refine already known products. The other way is to feed the animals less intensively and for this feeding strategy slow-growing breeds fit better. A simple recipe for how monogastric animals can be fed 100 % organic and regionally produced feed, and at the same time ensure animal welfare as well as economic competitiveness is not provided. However, several sub-solutions are proposed. The possibilities for combinations of regionally grown feed, low-yielding breeds with different feeding strategies are many, and they fit the organic principle well: "Organic farming should be based on living ecological systems and circuits, working with them, imitating them and helping them to maintain".

References:

Studnitz, M.(ed), Díaz-Gaona, C., Kongsted, A.G., Nørgaard, V. J., Papi, E., Perez, A.M., Reyes-Palomo, C., Rodríguez-Estévez, V., Roinsard, A., Steinfeldt, S., Stødkilde-Jørgensen, L., Theil, K.P., Åkerfeldt, M., 2019. Feeding monogastric 100% organic and regionally produced feed. Knowledge Synthesis. OK-NET EcoFeed. H2020-project.

<http://orgprints.org/34560/>

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