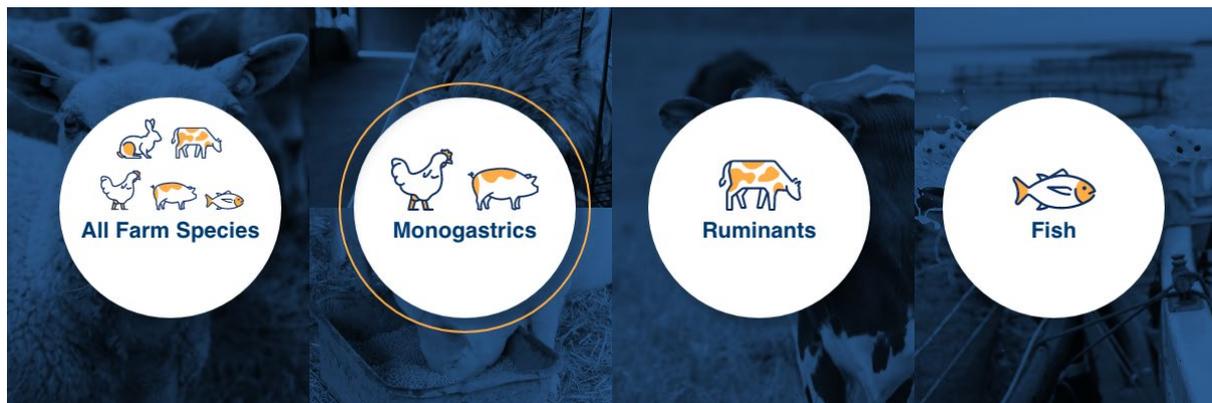


Advanced feeding strategies for enhanced and circular sustainable livestock and aquaculture production

How do they work?



MONOGASTRICS

FEFAC asked in autumn 2022 to its members what they can do to support the European livestock and aquaculture in the transition towards more sustainable production practice. This consultation showed that **animal nutrition has the potential to address many challenges** that may be common to all species or species specific and are applicable to all or some production systems (intensive, extensive, organic, etc.).

The purpose of this factsheet is to provide general information on **how animal nutrition solutions specific to monogastrics work** to address key priority challenges, broken down in three categories: **environment, animal health and animal welfare**. It complements the fact sheet on feeding techniques applicable to all species.

In addition, a number of **specific techniques, strategies and formulations**, supported by strong scientific evidence have been selected by FEFAC members and **showcased on the FEFAC website**, with detailed information on the conditions of use, the trade-offs, the economic aspects, the regulatory limitations when exist, as well as bibliographic references (mostly meta-analysis) for those who want to learn more.

ENVIRONMENTAL CHALLENGES

Environmental challenges concern both the impact on the environment from the production of feed materials and the impact of feed following its digestion. When it comes to the exposure to **soy-related deforestation** in the feed materials production stage, it applies to all farm animals, but one could argue it concerns in particular **poultry farming** as there the reliance on soy products is highest. After the stage of feed digestion, the **handling of manure** is the key challenge to tackle, with the consequent release of **ammonia** in the air and **phosphorous, trace elements** (copper, zinc) and **nitrates** in the soil/water. In particular, pigs produce a considerable amount of manure, which, if not managed correctly, can impact water quality and soil health, leading to environmental degradation. Manure management is a field of expertise on its own for all animal types, where the majority of environmental impacts must be neutralized.

The key environmental challenge identified by FEFAC members where animal feeding strategies can play a specific role for monogastrics is **nitrogen emissions**.

How can animal feeding strategies help tackle environmental challenges?

Animal feeding strategies can further contribute to impact mitigation, and are in fact often species-specific. To minimize **soil contamination**, the use of **phytase, free amino acids** and **proteases** in feed is a common solution in pig and poultry farming, which allows for more efficient uptake of the available protein from the feed, thereby also contributing to resource efficiency of feed inputs. The use of **organic trace elements** for example, such as chelates of copper and zinc, facilitates the passage of the mineral ion through the stomach and aids in its absorption in the gut. In pig farming, the use of **phase feeding** is a practice that allows for reducing protein content in feed, while the use of **benzoic acid** presents a specific solution to mitigate ammonia emissions from manure.

ANIMAL HEALTH CHALLENGES

The most critical health issues to be addressed by monogastrics breeders are **viral diseases**: the High Pathogenic Avian Influenza for birds and African Swine Fever for pigs are among the most critical viruses affecting poultry and pig farming globally. **High-level biosecurity** plans remain the baseline to manage these infections.

As for all species, the number one challenge for monogastrics breeders is to **minimize the need for antimicrobial treatments**. The ban on prophylactic treatment with antibiotics, including group treatment via medicated feed triggered a renewed interest in preventative measures, including tertiary prevention as defined by EFSA and EMA in the RONAFA report, i.e. **the ability of animals to cope with pathogens**. As far as pigs are concerned, the most critical period in terms of animal health is clearly **weaning**, with a high risk of diarrhoea for piglets due to changes from animal to vegetal proteins-based diets, crude proteins from plants serving as a substrate for pathogenic proteolytic bacteria.

Other non-infectious health issues of concern affecting birds are **footpad dermatitis** (often connected with wet litter) and **keel bone fractures**.

The key animal health challenges identified by FEFAC members where animal feeding strategies can play a specific role for monogastrics are: i) **weaning of piglets**, ii) **footpad dermatitis** and iii) **keel bone fractures**.

How can animal feeding strategies support monogastrics health?

There is little that animal nutrition can do in relation to viral diseases, except securing that feed deliveries do not contribute to virus dissemination and avoiding that animals facing nutritional deficiencies that would make them even more sensitive to the disease.

Regarding the risk of **piglet diarrhoea**, a key parameter to play with is to reduce the amount of indigestible protein in the diet by lowering the total amount of protein, which can be achieved by **using highly digestible protein** sources like potato proteins combined with supplementation with **free amino acids**.

Concerning **footpad dermatitis**, a lower level of crude protein, the inclusion of biotin and reduction in electrolytes (Na, K) balance in the diet, as well as feed additives such as enzymes hydrolysating non-starch polysaccharides and organic sources of microelements (zinc), may **reduce the litter moisture** and therefore have a positive effect on incidence and severity of footpad dermatitis in broiler chickens and turkey. Likewise, the addition of **omega 3** in the diets of broilers has positive effects on the incidence of **keel bone fractures**.

ANIMAL WELFARE CHALLENGES

Among the key animal welfare parameters being scrutinized at the moment, the question of mutilation is among the most appealing for EU citizens. **Pig castration** is motivated by consumers preference for meat exempt from boar taint, which is an off-flavour of pork caused primarily by a microbial breakdown product, skatole and a testicular steroid, androstenone. **Beak trimming and tail docking** are motivated by the need to protect animals against feather pecking and tail biting, which are unsuitable behaviours often linked to feeding practices.

Animal nutrition strategies can help reduce boar taint and limit aggressive behaviours.

The key animal welfare challenges identified by FEFAC members where animal feeding strategies can play a specific role for monogastrics are: i) **avoiding pig castration**, ii) **feather pecking** and iii) **tail biting**.

How can animal feeding strategies support monogastrics welfare?

The addition of chicory roots containing **inulin** in the diet during the last 4 days before slaughtering modifies protein fermentation and limits the production of skatole and incidentally boar taint. The provision of a **low-protein, grain-based diet** or beet pulp or palm cake can also have a positive effect.

The addition of **dietary fibres** in the feed increases the feeling of satiety, resulting in less manipulative behaviour directed at other animals and less oral behaviour, thus reducing aggressivity and the occurrence of **tail biting** and **feather pecking**.

Other sources of discomfort for monogastrics are for example the **risk of constipation** for sows, which may be addressed by the use of ingredients stimulating intestinal passage such as vegetable oil. Reduction of the risk of constipation is an officially recognized nutritional purpose (Regulation (EU) 2020/354).