FEFAC VISION ON ANIMAL NUTRITION

A multifunctional science, delivering solutions to a sustainable livestock[1] sector

Animal Nutrition is now much more than just increasing animals' performance: it is also how to keep them healthy and feeling well and how to minimise their impact on the environment. It is also how to make them deliver the animal products that consumers want. In short, a compound feed is much more than the sum of its ingredients. Investing in research on Animal Nutrition is essential to help EU livestock farmers preserving the sustainability and resilience of animal husbandry.

FEFAC vision on animal feed industry:
A knowledge driven, reliable partner of a competitive livestock sector

FEFAC vision on feed safety management:
Sharing responsibility for feed safety along the chain

FEFAC vision on animal nutrition:
A multifunctional science, delivering solutions to a sustainable livestock sector

FEFAC vision on sustainability:
A responsible and resource-efficient feed industry

[1] Livestock is meant here for food producing land & aquatic animals

FEFAC VISION ON ANIMAL NUTRITION

There are many different livestock farming systems which make them unique in their own way. But what they have in common is the requirement to provide the right feed to the specific breed of animal and the expectation that best practices as regards securing animal health, animal welfare and safe products are adhered to. To achieve these goals, animal nutrition is an intrinsic and essential parameter of any successful livestock farming system.

What is animal nutrition science about?

To meet the EU domestic demand for safe, high-quality and healthy foodstuffs of animal origin (eggs, milk and meat), as well as to take advantage of growing export opportunities, the quality and safety of animal feed are key factors.

To secure a reliable feed supply and improve the competitiveness of the livestock sector, the EU feed sector has explored new feed ingredients sources, such as co-products of the grain processing industry, with the goal of converting them into high value animal food products.

All these achievements can be attributed to a large extent to **Animal Nutrition Science**, which is about;

- Improving knowledge of the nutritional value of existing feed ingredients, by the continuous review of nutritional databases to reflect the impact of weather, geographical origin, processes undergone on the value of products, etc.;
- Determining better indicators of the animal nutritional requirements and the nutritional value of a feed: parameters used at the early ages of animal nutrition science were focussed on crude proteins, crude fats, crude fibre, minerals; nowadays, formulation of feed is based on digestible amino acids, bioavailability of minerals, net energy, etc.;
- Identifying interactions between feed ingredients, nutritional constituents and optimising their combination to meet animals demand;
- Identifying anti nutritional factors and defining strategies to neutralise/eliminate them;
- Studying the impact of feed composition on the quality and composition of food of animal origin;
- Studying effect of certain micro-ingredients (enzymes, gut flora stabilisers, etc.) and processes (grinding, pelleting, conditioning, coating, rumen protection etc.) on animal performance, health, welfare, quality of animal products and environmental impact.

Animal nutrition science has proved its ability to contribute significantly to nutrient efficient livestock production, fostering the safety and dietary quality of animal products for human consumption, enhancing the animal health and welfare status of farm animals and reducing greenhouse gas emissions and land use linked to livestock production on a unit product base (e.g. per litre of milk or kg of meat and eggs). A typical example is the reduction of the feed conversion rate for the production of poultry meat, which decreased by more than 20% in the last 40 years.

The EU livestock sector at the crossroads

The livestock sector has always been required to provide good quality, safe and good value animal products to consumers and will continue this mission. In addition, the livestock sector is facing a number of other multifaceted challenges, whose importance is increasing and requires an ad-hoc answer to contribute positively to the harmonised EU social & economic development model.

There are a number of unanimously acknowledged important trends at global level which must be considered by the EU livestock sector:

- The global demand for animal proteins is growing;
- The competition for agricultural products is increasing (food, feed, industrial), while means of production (land, water) are limited;
- Competition from third countries exporting animal products to the EU is increasing and the EU is not in a position to impose compliance with non-safety related EU standards;
- The development of antimicrobial resistance threatens the efficiency of medicines (especially antibiotics) in human & veterinary medicine;
- The reduction of the environmental impact per unit of animal product is not decreasing enough to offset the increase of the amount of animal products produced globally.

In addition, the EU livestock sector is also asked to address social concerns in a saturated market (e.g. “green” food of animal origin, animal welfare, etc.) in a social environment hostile to certain types of new technologies (nanotechnologies, cloning, GMOs).

At the same time, competitiveness remains a prerequisite for livestock farmers who are permanently asked to improve their performance, whatever the size of the farm or the production system (organic, extensive, intensive, etc.).

What can animal nutrition science bring to meet these challenges?

The feed and livestock sectors may structure their response to these global trends around three main topics: i) Resource efficiency, ii) Maintaining animals healthy for healthy food products and iii) Securing socially responsible livestock farming.

- **Resource efficiency** in the livestock sector is partly about how to convert feed resources in the most efficient way, thus contributing to close the bio-economy circle, and to explore new feed resources which do not compete with direct food use; in this sense, animal nutrition is playing a key role in improving knowledge of the nutritional value of new feed resources and, even more important, in better evaluating the needs of individual animals taking into account their specific genetic potential, the predictability of gut flora composition and multiple parameters measurable online on the farm.
- **Healthy animals** is about how to feed nutrients to animals under optimal management to resist disease and maintain gut health status via specific functional ingredients (prebiotics, probiotics, herb extracts, etc.).
- **Socially responsible livestock farming** is to build livestock production systems respectful of the environment and animal welfare standards; a nutritionally balanced feed is not only the key to minimise emissions and avoid animal deficiencies but new constituents / composition / processing may also provide extra benefit through a reduction of e.g. methane emissions or facilitation of digestion via dietetic feed.

The road to 2030

The European feed industry has the ambition and vision of a livestock sector harmoniously integrated into an overall smart EU social & economic model, in particular by:

- using nutrients more efficiently, thus reducing the environmental impact of livestock production, while improving the nutritional profile of livestock products to human consumers and safety status of feed to food producing farm animals and the ultimate consumers;
- enhancing the animal health and welfare status, thereby reducing the need for therapeutic treatment through preventive action.

FEFAC believes strongly that new findings in animal nutrition science will serve as the foundation of the sustainable development of a livestock industry, respectful of standards and allowing EU farmers to remain competitive. Over the last 20 years, research and innovation in animal science, including animal nutrition, allowed the EU livestock sector to offset its structural competitiveness handicaps vis-à-vis third country competitors (costs of higher standards, labour costs, protein deficiency). Further significant knowledge gains in the area of animal nutrition and knowledge transfer and management at farm level must be achieved to help EU livestock farmers remain competitive. They will also enhance animal husbandry, animal welfare and resource efficiency, while continually, reducing the need for interventions with antibiotics especially with regard to gut health related infections improving safety of both feed and food of animal origin. To this end, **animal nutrition science must now reach the next level.** This requires **further investments in precompetitive research, in particular on the following priority areas:**

- **Increasing nutrient use efficiency and reducing emissions**

New and innovative models on the nutrition of farm animals are expected to significantly contribute to a further reduction of energy and nutrient losses (in particular N, Cu, Zn, P):

- new and/or improved feed evaluation models, based on more accurate estimations of the energy and nutrient supply from animal feeds and energy and nutrient requirements of farm animals
- innovative nutrient-based (dynamic mechanistic) nutrition and response models, including dynamics and kinetics in digestion and metabolism

Furthermore there is a strong need to develop new (molecular) indicators for nutrient use efficiency in farm animals as well as a strong need to develop innovative sensors and intelligent models for monitoring and management of nutrient use (in)efficiencies at animal level (and also for animals in large herds).

- **Understanding the complexity of interactions in the gut**

The most important collective research needs relate to the improvement of animal health, including the unravelling of complex interactions between nutrients, micro-ingredients, stressors and the microbiota in the gastrointestinal tract and the immune system.

- **Improving knowledge on the impact of feed processing on gut health**

Feeds undergo various processes, from grinding to pelleting, which all have their impact on the physical characteristics of the feed (e.g. size of the particles structure) which has shown to have an impact on the gut flora balance. Further research is needed to evaluate the interaction between physical properties of feed and the mechanics of development of immunity and increased resistance of animals to pathogens.

- **Adapting/developing new feeding strategies to meet animal welfare challenges**

Research can contribute to the reduction of various animal welfare challenges via the feed itself. For example, consider the role of diet and satiation in the social behaviour and ethological welfare of animals, improving vitality and reducing early losses, the relationship between diet and the footpad quality of poultry and increasing the longevity and lifetime production of dairy cows, sows and laying hens.

Other areas requiring research concern e.g. the improvement of the quality of food products of animal origin via feed (e.g. omega 3, selenium, iodine, etc.).

The role of the feed industry will then be to bring the knowledge to the farm level in two forms:

- via manufacturing of feed based on enhanced nutritional systems (publically developed or developed in-house by companies) integrating new calculation parameters and models;
- via the developing of feedings strategies based on new data management tools allowing precision feeding.

What is FEFAC doing?

Together with key research institutes of the feed chain and national feed associations, FEFAC established the European Center for Feed Technology (**EUFETEC**) which was in charge of developing the EU Strategic Research and Innovation Agenda for feed. This document identifies the future breakthroughs that research in animal nutrition can trigger to address the many challenges of the EU livestock sector. The EUFETEC document was shared with chain partners and key decision makers to help design the EU Research Working Programmes in the framework of Horizon 2020.

These breakthroughs require for most of them a multidisciplinary approach, involving simultaneously genetics and animal health expertise. This is also why EUFETEC is member of the **Animal Task Force**, a gathering of Technology Platforms and Research Institutes whose ambition is to promote a multidisciplinary approach of research in the livestock sector.

Although FEFAC's vocation is not to participate in research consortia, FEFAC is involved in many Advisory Boards of European research projects animal nutrition and is also contributing to dissemination of their output.