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SUSTAINABILITY MEETS FEED ADDITIVES

“Providing livestock with an optimal, balanced diet, supplying all essential nutrients in the required quantity, seems crucial if we want them to fully exploit their genetic potential and provide us with high-quality end products, like eggs, milk, or meat. In this context, not only are the feedstuffs important, but also the different kinds of feed additives that are used in diets make a, if not the, difference.”

The rapidly growing and prospering world population comes with a rising demand for food and, as part of a complete and balanced nutritional intake, animal-derived protein is required and should be available, accessible, and affordable. In future years, as demand grows, carrying out sustainable and, at the same time, economically viable livestock production on a global level seems to be a constant challenge for us all.

With our planets limited resources and climate change threat, livestock production is in the spotlight and is frequently pointed out as one of the biggest causes responsible for resource scarcity, pollution, and warming of the planet due to high emissions of greenhouse gases (GHG) from these activities.

Although we don't start from scratch, there is still a long way to go. The environmental impact of livestock activities must be mitigated, never forgetting the social, cultural, and economic importance of this activity, especially in developing countries. And to all farmers, a profitable economic-activity should be guaranteed for the current and future generations.

FEEDING – THE KEY

Appropriate animal feeding plays a key role if we want to ensure the resilience and welfare of our farm animals, the basis of successful animal production, and, consequently, for high-quality animal-derived products. Providing livestock with an optimal, balanced diet, supplying all essential nutrients in the required quantity, seems crucial if we want them to ful-

ly exploit their genetic potential and provide us with high-quality end products, like eggs, milk, or meat.

In this context, not only are the feedstuffs important, but also the different kinds of feed additives that are used in diets make a, if not the, difference. This is the reason for us to take a closer look at common feed additives and share some thoughts about the necessity of these precious supplements.

WHAT ARE FEED ADDITIVES?

Every day, billions of livestock on farms around the world are supplied with feed. Excellent quality and good digestibility are the hallmarks of valuable feed. To further improve the efficiency of animal feed, certain additives have been added to the feed for decades.

According to FAO and WHO, feed additive is defined as follows; “Feed additive: Any intentionally added ingredient not normally consumed as feed by itself, whether or not it has nutritional value, which affects the characteristics of feed or animal products. Micro-organisms, enzymes, acidity regulators, trace elements, vitamins, phyto-genic substances, functional ingredients, and other products fall within the scope of this definition depending on the purpose of use and method of administration.”¹

A very similar definition is provided by EFSA² –

European Food Safety Authority, “Feed additives are products used in animal nutrition to achieve an effect on the feed itself, on the animals, on food products obtained from the animals consuming the feed additive, or on the environment. For instance, feed additives are used to enhance the flavor of feed, to meet the need for certain nutrients, or to increase the performance of animals in good health. They are used in feed for food-producing animals and in pet food.”

According to the European Union regulation, feed additives are categorized as:

- Technological additives – e.g. preservatives, antioxidants, emulsifiers, acidity regulators, silage additives.
- Sensory additives – e.g. flavors, colorants.
- Nutritional additives – e.g. vitamins, amino acids, trace elements.
- Zootechnical additives – e.g. digestibility enhancers.
- Coccidiostats and histomonostats.³

SMALL BUT MIGHTY

As stated, feed additives optimize the nutritional value, color, aroma, or texture of the feed. This can affect the feed itself (e.g., prolong shelf life, prevent mold growth) or directly support the animal (e.g., provide vitamins and minerals, support intestinal microbiota, strengthen the immune system, and contribute to the general well-being), which in turn has





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a positive effect on the performance of the animals.

As feed additives receive increased attention among scientists, nutritionists, feed manufacturers, and producers, research helps in developing more safe and efficient solutions. As an example, plant-derived (phytogenic) feed additives (PFAs) are a relative newcomer to commercial livestock production. Nevertheless, they are moving further into the spotlight due to their holistic and broad-spectrum functionalities. Phytogenics are standardized, specific, and science-based combinations of bioactive compounds found and inspired within the plant universe with benefits for animals, people, and the environment.

A WORLD WITHOUT FEED ADDITIVES?

Let's assume that feed additives did not exist. What would livestock production look like? What would be the impacts?

The first impact would be on feed quality and safety, as with the lack of **technological additives**, vast amounts of feed would be wasted, and animal health and welfare would be at risk. Certain feed additives are added to the ration to ensure a certain constant feed hygiene. Mycotoxin binders, for example, ensure that the animals' exposure to mycotoxins (metabolic products of molds) through possible contamination -in the field or through storage- is kept as low as possible. These additives are an excellent tool for us to be able to produce high-quality, safe, products as human and animal food.

Without **nutritional and zootechnical additives**, the animals would probably have to eat much more to meet their nutritional requirements for performance in most instances. Not all species can spend the entire day eating large amounts of feed. In addition, feed costs would rise due to the increased

consumption of feedstuffs. An increased demand for feed would of course be linked to increased land use and water consumption. This probably would only be partially feasible, especially in regions that have always struggled with water supply and/or where soil resources are already scarce.

In the absence of **organic acidifiers, pre, pro, post-biotics, and phytogetic substances**, known for their benefits as gut stabilizers, antimicrobial bio-actives, and antioxidants, the animals' welfare, health, and performance would for sure be affected.

Environmental pollution from underutilized nutrients would potentially be higher as more phosphorus and nitrogen would be excreted by the animals in the absence of digestibility enhancers, for example, phytogetic substances and enzymes. Also, high aerial ammonia concentrations would be a menace to not only the housed animals' health and performance but also to workers' safety and can in the end contribute to higher atmospheric pollution, land and water acidification, and eutrophication.

SMALL INPUT – GREAT OUTPUT

Sustainable food production without providing optimal all-around care for our livestock would hardly be possible. To achieve high performance and reduce environmental impacts, feed additives are generally included in the everyday feeding of livestock.

In-depth know-how about the raw materials

used, the animals, and their respective nutritional requirements, and not the least, the sophisticated production processes build the basis for high-quality feed and feed additives.

USING TOMORROWS FEED ADDITIVES TODAY

In a rapidly growing world with a call for healthy foods and, at the same time, a global interest in sustainable production, the highest priority must be placed on efficiency and reduction of environmental impact, water use and recycling, and savings in natural resources. The feed industry has been working continuously to develop and supply innovative solutions for optimizing animal nutrition, one of them being sophisticated feed additives that affect the characteristics of feed, animal productivity, welfare and health, and livestock supply chains environmental impact.

Targeted use of excellent feed additives will be crucial for providing us and future generations with safe and high-quality food of animal origin, contributing to sustainable food production systems.

References:

¹FAO.2020. *Environmental performance of feed additives in livestock supply chains – Guidelines for assessment – Version 1. Livestock Environmental Assessment and Performance Partnership (FAO LEAP). Rome.* <https://doi.org/10.4060/ca9744en>.

^{2,3}<https://www.efsa.europa.eu/en/topics/topic/feed-additives>

About Sandra Chamusco

Sandra Chamusco is Global Technical Lead Sustainability Additives at Cargill Animal Nutrition. She has worked in the swine nutrition field for over 25 years, where she has held various positions as a feed formulator, customer advisor and Global Technical Manager.

Sandra Chamusco graduated in Zootechnical Engineering at University of Évora, Portugal and Sandra joined Cargill in 2022. Chamusco is leading and collaborating in several projects related to feed additives and sustainability.

About Elisabeth Rohrer

As former member of the technical communications team at Delacon, Elisabeth Rohrer has many years of experience in writing articles and texts dealing with phytogetic feed additives in animal nutrition. Rohrer has a PhD in agriculture from the University of Natural Resources and Life Sciences, Vienna, she joined Cargill in 2022 and has been working as MarCom Content Manager ever since.