Organic trace minerals improve animal production sustainability

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Introduction

The animal production industry is facing increased pressure from legislators and consumers to provide sustainable meat, eggs and dairy products. This creates new challenges: supporting animal health and welfare while reducing the carbon footprint, improving production efficiency while reducing the use of antibiotics, and finally improving quality while remaining economically competitive. Trace minerals such as copper (Cu), iron (Fe), zinc (Zn) and manganese (Mn), are essentials micronutrients. They not only support growth performance, but are also needed for good development, fertility and health or immunity and the high quality of final products.

In commercial diets, trace minerals are often supplemented in inorganic form. This is an easy choice as legal limitations still allow high levels of supplements and they are generally inexpensive. Because of their limited bioavailability, high doses are needed to fulfill requirements. This often results in imbalanced nutrients and environmental pollution. Supplementation with more bioavailable organic trace minerals such as B-TRAXIM® glycinates may offer a better solution to support sustainability as this choice makes sense for every stakeholder along the feed production chain right up to the end consumer.

Sustainability within the production chain

In premix production, organic trace minerals are a guarantee of safety from a health point of view. Inorganic minerals are often really fine particles with fractions under 100 microns that can cause lung damage if breathed in by the worker. With a larger particle sizes, glycinates from Pancosma are safer to use due to the absence of dust and they therefore contribute to the welfare of the worker.

As feed is by far the highest cost components in livestock systems, it is important to ensure that diets are formulated with an optimal return to cost ratio. Therefore, trace minerals that do not have an adequate return on investment, are the most expensive, regardless of cost. Studies suggest that binding Cu, Zn, Fe and Mn with amino acids and peptides can enhance the bioavailability of these trace minerals, thereby leading to better overall performances such as improved milk production, growth, accumulation in tissues, reproduction and general health status in livestock. Moreover, this enhanced bioavailability allows a reduction of up to 50% of dietary mineral supplementation to be achieved while still maintaining performances. Therefore, we can expect that animals easily achieve their genetic potential while minimizing trace mineral supplementation and excretion.

Although trace minerals do not directly affect quality parameters, they can still influence them. Iron influences the color of beef meat. Cu, Zn and Mn as part of the antioxidant system, are important for cell integrity notably after slaughter, to limit drip loss. In the dairy industry, a lower somatic cell count has been established with the use of organic Zn (Wall et al, 2016), resulting in a better profitability of the milk and a safer product for the consumer. In the meantime by meeting basic physiological needs, essential trace elements reduce the diseases related to trace element deficiencies and therefore contribute to animal welfare.

Finally, trace elements accumulate well in tissues, which is directly in line with the United Nation health program, encouraging trace elements accumulation in meat products to answer the special needs of the population.

Reducing the environmental footprint

Because of high supplementation, elements concentrated in manure are accumulated in the soil, where they may impose a medium or long-term toxicity risk to plants and micro-organisms. For instance, Zn will achieve a concentration of around 200ppm, within 120 years, if their slurry application is not reduced. Soil microbial activity and mass are adversely affected with even lower Cu and Zn concentrations in soils (30 to 50 and 100 to 200 ppm, respectively) (Jondreville et al., 2003). Lowering the trace elements supplementation level is a key issue for extending this timescale and minimizing the environmental footprint.

Organic minerals were designed to reduce antagonistic relationships within the gastrointestinal tract and therefore to increase the bioavailability of trace elements. Studies comparing the bioavailability of glycinate to sulfate have shown good results in favor of the organic source while still preserving at least the same performances. In piglets, Männer et al. in 2006, found a 31.1% improved absorbability and in ruminants, Spears et al., in 2004, found an almost doubled bioavailability in the presence of a strong antagonist. Consequently less input means also less output. Due to this superior absorption, it is now possible to reduce the supplement dose and keep or even increase the animal performances.

Conclusion

Because of their high bioavailability, organic trace minerals have the ability to answer new challenges coming from the legislation, in favor of lowering input and output of minerals while supporting animal health and welfare. In this context, where the pressure from legislation and consumers is becoming stronger, organic trace minerals are becoming more and more relevant.

They positively support sustainability within the production chain as they bring safety to workers handling the product; they maximize the return on investment by reducing the expense of supplements and improving performances with lower supplementation. Finally, their bioavailability reduces the mineral environmental footprint by lowering output which causes soil pollution and long-term toxicity risk.

As part of the feed industry, organic trace elements have a lot of challenges to face. In the end, they play an important role in sustainability as they can help in reducing the environmental footprint and producing better quality products, in line with public health regulations for the end consumer while preserving the welfare of workers within the production chain.

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