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How improving animal production sustainability with organic trace minerals?

"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. These attributes support public health regulations for the end consumer, and they also preserve the welfare of workers within the production chain."

INTRODUCTION

The animal production industry is increasingly looking for ways to provide sustainable meat, eggs and dairy products. This creates new challenges and opportunities: supporting animal health and welfare while reducing the carbon footprint, improving production efficiency while reducing the use of antibiotics, and finally improving overall quality while remaining economically competitive. Trace minerals such as copper (Cu), iron (Fe), zinc (Zn) and manganese (Mn), are essential micronutrients. They not only support the animal's growth, but are also needed for fertility, immunity and general health.

In commercial diets, trace minerals are often supplemented in inorganic form. This is an easy choice

as high levels of supplements are permitted and are generally inexpensive. Because of their limited bioavailability, higher doses are needed to fulfill requirements. This often results in imbalanced nutrients and environmental pollution. Supplementation with more bioavailable organic trace minerals 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 for the workers' health. Inorganic minerals are often really fine particles that can

cause lung damage if inhaled. With a larger particle sizes, glycinate from Pancosma are safer to use due to the absence of dust. They therefore contribute to the welfare of the worker.

As feed is by far the highest cost component 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. This leads 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 up to 50% of dietary mineral supplementation to be achieved while still maintaining performance. Therefore, we can expect animals to easily achieve their genetic potential while minimizing trace mineral supplementation and excretion.

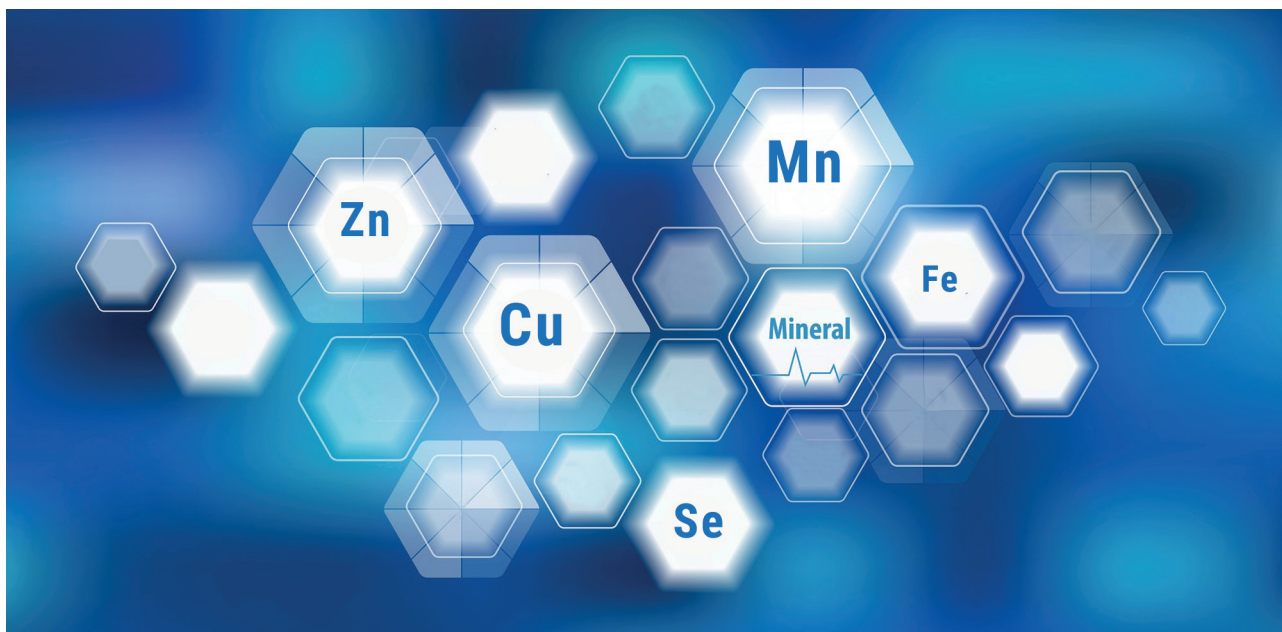
Although trace minerals do not directly affect quality parameters, they can still influence them. Iron influences the color of beef meat. Copper, Zinc and Manganese are part of the antioxidant system

and are important for cell integrity (notably after slaughter for limiting 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 higher milk production. In the meantime by meeting basic physiological needs, essential trace elements can play a role in reducing susceptibility to reduce diseases related to deficiencies and therefore contribute to animal welfare.

Finally, trace elements accumulate well in tissues, which is directly in line with the United Na-

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tion health program (FAO, 2001. Human Vitamin and Mineral Requirements - report of a joint FAO/WHO expert consultation. Bangkok, Thailand.). The accumulation of trace elements in meat products provides an answer for 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 pose 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 potentially even increase animal performance.

CONCLUSION

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. These attributes support public health regulations for the end consumer, and they also preserve the welfare of workers within the production chain.

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About Pancosma:

Pancosma, Swiss company headquartered in Rolle, Switzerland, is a global leader in developing, manufacturing and distributing a wide range of innovative feed additives. The company is present in more than 75 countries. Its portfolio consists of phytonutrient-based technologies, organic trace minerals, palatants, yeast and organic acids. Pancosma continually strives to deliver innovative solutions for animal nutrition through its commitment to research, development and sustainability.

Pancosma is a brand of ADM, a global leader in human and animal nutrition and the world's premier agricultural origination and processing company. For more information, visit www.adm.com.

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