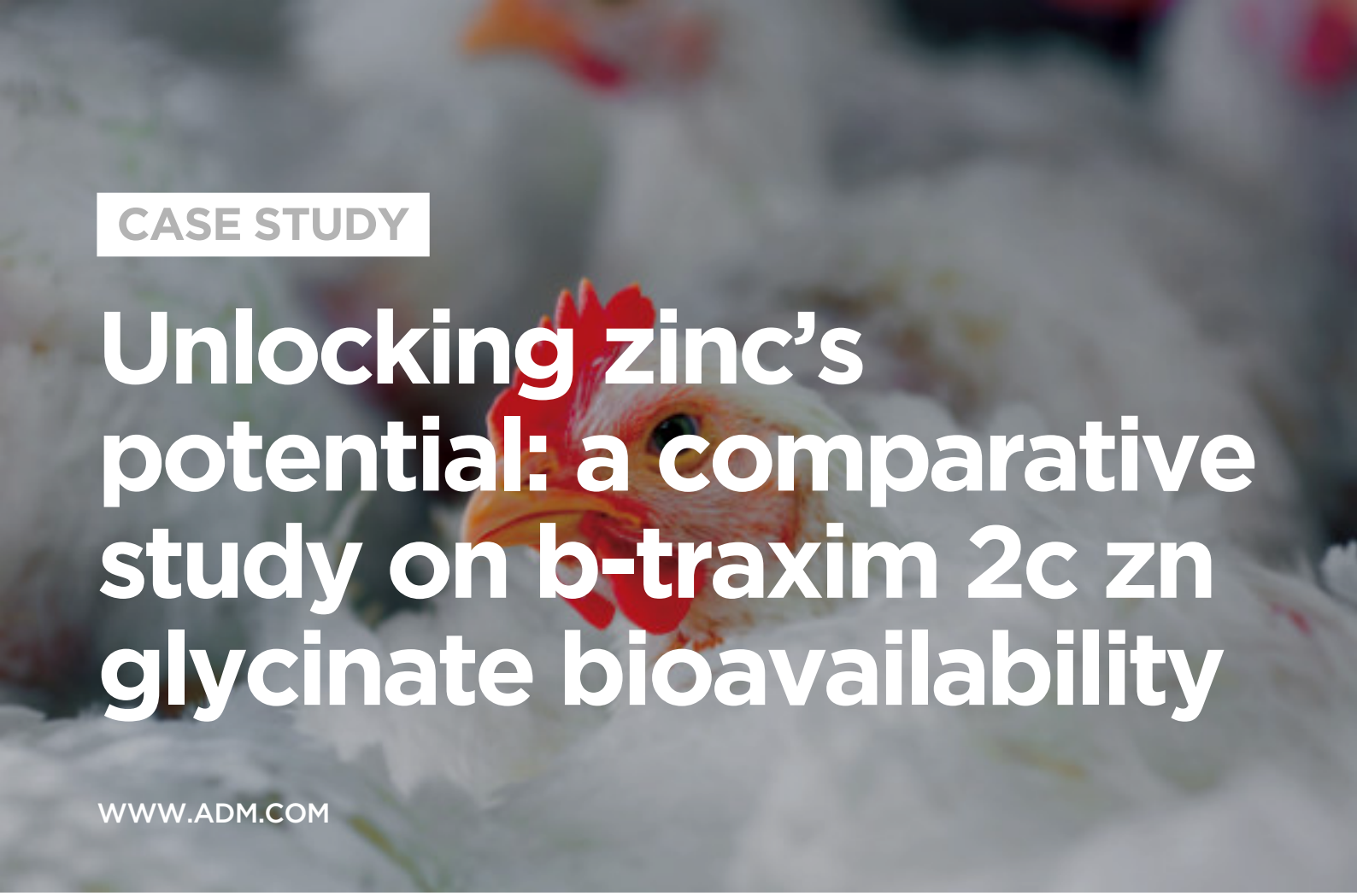


CASE STUDY

Unlocking zinc's potential: a comparative study on b-traxim 2c zn glycinate bioavailability

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Zinc is an essential trace mineral critical for developing and maintaining key physiological functions in poultry, such as immunity, enzyme activity, feathering, bone development, reproduction and overall health.

Scientists are still exploring zinc's role in previously ignored zinc-containing proteins and enzymes. However, not all zinc sources are equal in bioavailability, which is the proportion of a nutrient absorbed and effectively utilised by the animal. Ensuring optimal zinc absorption is critical to improving animal performance and feed efficiency and minimising mineral excretion into the environment.

Inorganic zinc sources, such as zinc sulphate or zinc oxide, are commonly used in feed formulations but often face challenges related to stability, hygroscopicity, absorption and environmental impact. Organic zinc sources, like zinc glycinate, offer promising alternatives by improving mineral absorption and utilisation.

For example, ADM's B-Traxim 2C Zn glycinate is designed to have superior zinc absorption, ensuring optimal animal bioavailability. This was achieved by chelating (linking) zinc to glycine, the smallest and simplest amino acid, resulting in a highly stable and unique chemical structure with high metal concentration, crystalline form and enhanced stability.

This zinc glycinate has rapid uptake in the gastrointestinal tract. Historically, understanding the importance of zinc in animals was not easy due to the lack of observed symptoms of zinc deficiency. This is unlike perosis observed during manganese deficiency or rickets observed during vitamin D deficiency. Therefore, researchers used semi-purified diets to understand the physiological importance of zinc by reducing the background zinc contribution from typical feed ingredients and controlling other confounding variables during mineral studies.

To scientifically validate the efficacy of B-Traxim 2C Zn glycinate, a comparative study was conducted to evaluate its bioavailability against zinc sulphate and other commercial organic zinc products (zinc amino acid hydrate). This article explores the study findings and their implications for poultry nutritionists, producers and feed formulators looking to maximise efficiency and performance.

The bioavailability study: design and key findings

To compare the bioavailability of B-Traxim 2C Zn with zinc amino acid hydrate relative to zinc sulphate, a controlled study using a depletion–repletion model was conducted in broilers. Day-old Ross 708 chicks were fed a Zn-adequate corn-SBM diet from D0 to 4 and a Zn-deficient diet from D4 to 8, followed by feed withdrawal.

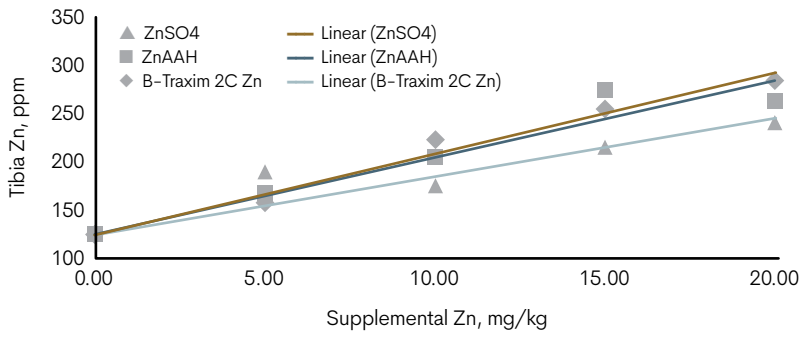


Fig. 1. Relative bioavailability of tibia zinc versus supplemental zinc.

On D9, birds were randomly distributed to cages and fed one of 13 semi-purified diets (including corn starch, dextrose and soy protein concentrate) with either no supplemental zinc or zinc supplemented via B-Traxim 2C Zn, zinc amino acid hydrate, or zinc sulphate at 5, 10, 15, or 20 ppm added Zn until D22.

The study assessed D22 body weight gain (BWG) and tibia zinc content as bioavailability parameters. Bioavailability was calculated based on multiple linear regression followed by slope ratio analysis relative to zinc sulphate.

Key findings

Zinc level, irrespective of source, significantly affected the broiler's growth and tibia zinc accumulation. Data from this study showed the zinc requirement to maintain Day-22 BWG for fast-growing high-yield broilers was around 12 mg/kg of supplemental zinc (Fig. 1).

However, the tibia zinc response to increasing levels of supplemental zinc did not plateau, indicating broilers did not reach their zinc requirement for tibia mineralisation. The bioavailability of zinc sulphate (reference inorganic source) was 100%, zinc amino acid hydrate was 103.1%, and B-Traxim 2C Zn was 114.8% based on body weight gain (Fig. 2).

Although both organic sources of zinc had statistically equivalent relative bioavailability (RBV), the glycinate had 11.7% higher BWG RBV. This study also measured RBV based on tibia zinc content. Again, zinc sulphate was 100% RBV. Zinc amino acid hydrate was 138.9%, and B-Traxim 2C was 145.7% based on tibia zinc (Fig. 2).

Both organic sources had statistically equivalent RBV; however, B-Traxim 2C Zn had 6.6% higher tibia Zn RBV than zinc amino acid hydrate.These findings agree with the published literature and show organic trace minerals have superior bioavailability, mainly observed in zinc bone mineralisation. Both organic trace minerals significantly improved tibia zinc compared to zinc sulphate.

Advancing precision nutrition with B-Traxim 2C Zn

As the demand for efficient and sustainable livestock production grows, selecting the right trace mineral source becomes increasingly essential. The bioavailability study demonstrated that B-Traxim 2C Zn has higher bioavailability than zinc sulphate, evident in higher tibia zinc accumulation.

Therefore, organic trace minerals such as B-Traxim 2C Zn can ultimately reduce the environmental impact of over-supplementing trace minerals while optimising animal physiology and growth, representing a step forward in precision nutrition.

Future studies by the ADM Animal Nutrition team will focus on evaluating B-Traxim 2C Zn in commercial poultry diets, understanding the effect of phytase on zinc requirement and assessing other organic trace minerals, including copper, iron and manganese.

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Fig. 2. Relative bioavailability of body weight gain and tibia zinc based on inorganic and organic trace mineral sources.

