

# Potentiated zinc, microflora modulation and broiler meat quality

Current sky rocketing of raw materials prices are pushing producers to seek even more for tools to improve performance and meat quality in broilers. Because zinc is deficient in most natural feed ingredients, this essential trace element is commonly supplemented to optimise growth performance and to maintain animal's health. Thus, the selection of the right source to be fed can be crucial for profitability.

by Axel Minetto, Product Manager,  
and Rahma Balegi, R&D Manager,  
Animine.  
[www.animine.eu](http://www.animine.eu)

## Physicochemical properties of potentiated zinc modulates microflora

From hatch to slaughter, the role of gut health is primordial in broiler performance. It has been known that zinc is an essential element to improve gastrointestinal functionality and health.

Its effects are related to a better gut integrity, lower expression of inflammatory cytokines, and microbiota modulation.

However, not all the zinc sources have the same bioavailability, nor the same effects on gut function.

Several in-vitro and in-vivo studies have shown that potentiated zinc is more effective than a standard ZnO source to reduce the growth of pathogenic *E. coli* and



*C. perfringens*. This effect can be related to the higher specific surface area of potentiated zinc which increases the surface of contact with bacteria resulting in a stronger antibacterial effect.

The improved gut health is only one of the potential modes of action by which zinc improves performance.

When assessing  $\alpha$ -diversity (Shannon and Simpson index) under challenging conditions of necrotic enteritis, the microbiota profile characterisation by 16s rRNA gene sequence analysis revealed that potentiated zinc increased microbial diversity and resilience in ileum at Genus level.

A significant shift on the reduction of coliforms and an increase in lactic acid bacteria as doses of potentiated zinc increases was observed. Lactic acid producing bacteria are known to have a positive effect on gut health.

As shown in past studies, the effects of potentiated zinc source on microbiota

modulation could mainly explain improvements in FCR, resulting in better performance.

## Zinc improves growth performance and meat quality

Zinc deficiency in fast growing-animals is characterised by decreased feed intake, decreased growth, low circulating levels of growth hormone (GH) and insulin-like growth factor-I, and decreased hepatic production of insulin-like growth factor-I, GH receptor, and GH binding protein.

Zinc positively affects feed utilisation through participating in the metabolism of carbohydrates, lipids, and protein. Zinc supplementation also has the potential to improve carcase yield and meat quality in broilers as has been demonstrated in several published studies.

*Continued on page 12*

Fig. 1. Performances from day one to slaughter (35 days).

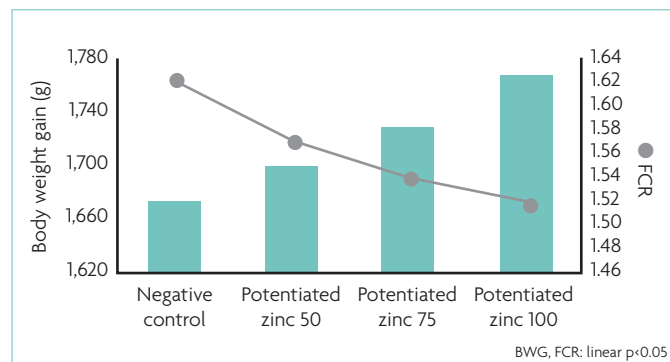
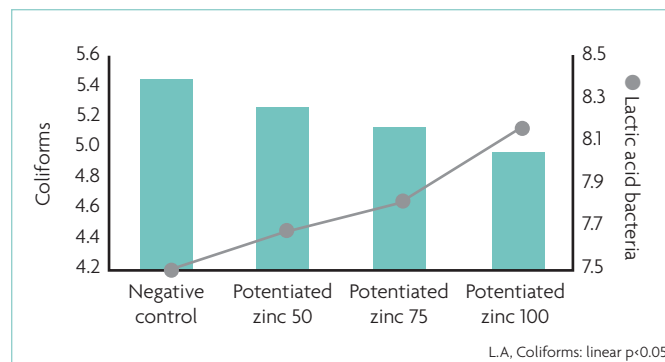


Fig. 2. Microbiota change in ileum ( $\log_{10}$  CFU/g).



Continued from page 11

### Zinc bioavailability and microflora modulation are keys to success

A recent trial published by Dankook University in South Korea revealed the interest of a highly bioavailable active form of potentiated zinc (Hizox, Animine). In this trial, the impact of several doses of potentiated zinc on performance, gut health, meat quality and gas emissions in broilers was evaluated.

A total of 680 male broilers (Ross 308) was divided in four treatments with 10 replicates of 17 birds each, from day one to 35. The treatments consisted of a negative control with no zinc supplementation (32ppm of native zinc) and potentiated zinc supplemented at 50, 75 and 100ppm of zinc.

Results showed a significant dose-response in performance of broilers fed increasing levels of potentiated zinc. As shown in Fig. 1, the body weight increased and feed-conversion ratio was improved together with increasing levels of potentiated zinc ( $P<0.05$ ).

A linear regression estimated an improvement of one point in FCR for every 10ppm of potentiated zinc supplemented. This improvement of performance could be linked to a better gut health obtained with the better ileal microbiota balance ( $P<0.05$ ) (Fig. 2). Indeed, potentiated zinc has the unique ability to shape intestinal microflora. In addition, the supplementation of

potentiated zinc also had a positive effect on ammonia emission reduction ( $P<0.05$ ). Since ammonia in the barn is a major issue in broilers for animal and farmer health, this aspect is really interesting. Finally, the supplementation of potentiated zinc also improved meat quality as bioavailable zinc can play an important role on the antioxidant system. An improved antioxidant system helps to maintain tissue integrity and prevent cells from releasing their water content into external media.

As shown in Fig. 3, the increase of potentiated zinc supplementation improved the water holding capacity of the meat ( $P<0.05$ ) participating in higher meat yield ( $P<0.05$ ).

### Right dosage of potentiated zinc makes the difference

Certain zinc sources have the potential to be highly bioavailable while modulating microflora for a better gut resilience.

When fed at the right dosage applying the mineral precision feeding rules, it represents a golden opportunity to promote both sustainable and profitable broiler production without neglecting overall performance. ■

References are available  
from the author on request

Fig. 3. Muscle yield.

