

5 reasons why banning Zinc Oxide is a good idea

By Ana Caroline Fonseca, Product Development at Nuscience

By enforcing the piglets with an exogenous defence shield called Vitazero® Nuscience provides a total solution for replacing zinc oxide at therapeutic dosage.

For decades high dosages of zinc oxide (ZnO) have been used in piglet nutrition to prevent weaning diarrhea. However, current reports are highlighting its negative effects on animals' performance and on the environment. Its contribution to the increase of antimicrobial resistance, the change on the piglets' microbiota, accumulation of Zn ions in vital organs and environmental issues are the main reasons why the European Union decided to ban the use of ZnO by 2022.

Increased antimicrobial resistance

After 70 years of antibiotic use, bacteria developed many mechanisms that prevent them from being eradicated by drugs (Antimicrobial Resistance or AMR). These processes are mediated by genes that are expressed when the bacterium is exposed to a particular agent or environment. Recent literature has shown that, ZnO in feed and in the manure has a consistent function in the maintenance and proliferation of antibiotic-resistant genes (Cavaco et al. (2011)). These genes can share its phenotypes in many environments and can have several clones that are related to the antimicrobial resistance mechanism developed (co-selection) against antibiotics and heavy metals like zinc used in swine production.

Changed composition of intestinal microbiota in piglets

The exposure to high dosages of ZnO, may cause a selection and a change in the intestinal microbial composition of piglets during the weaning phase. Figure 1 shows how dietary ZnO modulates the microflora of piglet by increasing the pathogenic Enterobacteriaceae group and decreasing the lactic acid producing population, negatively affecting piglet intestinal development and health. This is the most important reason why diarrhea is often seen as soon as ZnO is removed from the diet.

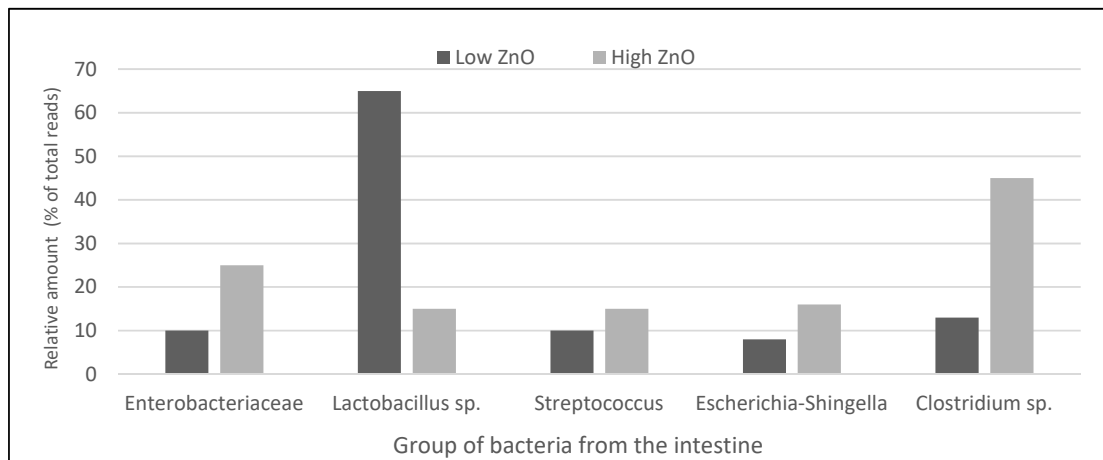
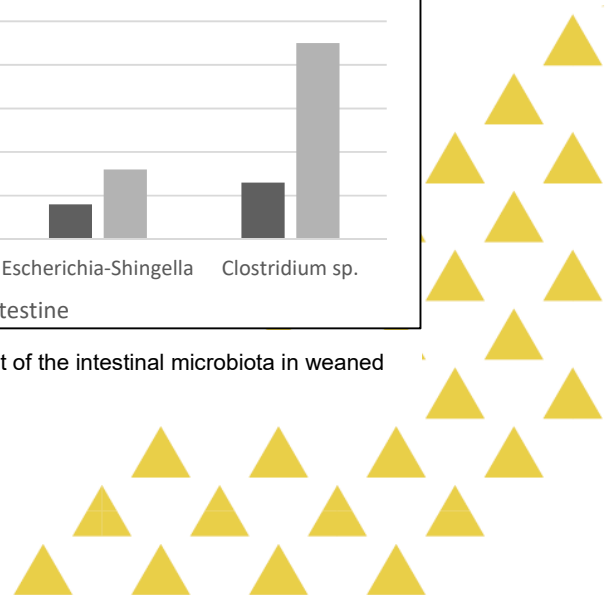


Figure 1. The impact of high dietary zinc oxide on the development of the intestinal microbiota in weaned piglets. Figure adapted from Starke et al., (2013).



Accumulation in important vital organs

An imbalance of Zn homeostasis in the piglet's body results in an accumulation of Zn ions in organs such as kidneys, liver, and pancreas. The liver, is responsible for Zn absorption in the organism and can store high amounts of Zn. However, such high concentrations of Zn can be toxic, leading to stress responses impairing its metabolism. Damaging the liver in a very early states will lead to impaired performance throughout the whole life of the piglet.

Environmental issues

Pig manure is frequently used as an organic fertilizers for soils. Through the manure large amount of Zn ions are spread in the soil and can reach the water, causing changes in the composition of these natural sources used by humans for cultivation of food and daily routine.



Total approach

Only a multifactorial approach will succeed in tackling these challenges. In order to reduce antibiotics and replace ZnO in swine production Nuscience offers a complete **Zero-approach** including managerial support, nutritional expertise/optimization and the feed additive Vitazero®.

Vitazero® provides the piglet with an exogeneous defense shield. A synergistic mixture of short and medium chain fatty acids kills pathogenic bacteria entering the stomach and regulates the intestinal flora by increasing *Lactobacilli* population. Purified medium chain fatty acids not only have a high antimicrobial activity increasing villus/crypt ratio but also improve overall immunity. To prevent metabolic stress, a combination of natural anti-oxidants will lower the intestinal permeability and maintain the gut barrier. Finally a unique upgraded fiber concept agglutinates pathogens in the intestine creating a wash out effect and also blocks endotoxins from binding on intestinal receptors.

