

Comparison of zinc sources for piglet diets.

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Summary

- Not all zinc oxides are equal.
- Zinc Oxide (ZnO) used at pharmacological levels is being removed from use in the EU and is under pressure in other regions of the world.
- Potentiated Zinc Oxide (HiZox®) is a new form of ZnO that provides the same performance at a fraction of the dose of pharmacological levels of ordinary ZnO
- HiZox is the same cost as high levels of ordinary ZnO and overcomes most, if not all of, the downsides of standard ZnO.

There are many different ZnO sources. Zinc oxide can be manufactured with various raw materials and manufacturing processes which, while technically these all meet the definition of ZnO, creates variability in purity, activity and performance.

Physico-chemical properties of ZnO products used in animal nutrition show strong differences which explain variable bioavailability values and antibacterial strength.

Using a pharmacological level of ZnO is well known to increase growth and reduce Post Weaning Diarrhea (PWD) in piglets, however, there is a downside from overuse:

- Contamination by heavy metals
- Nutritional interactions (copper, phytate, reduced phytase efficacy, feed acidifiers...)
- Risk of toxicity for the animals
- Environmental concerns
- Development of zinc and antimicrobial resistance

Is there another way?

Manufacturing zinc oxide at the nano size (HiZox®) can elicit significant differences compared to the bulk equivalent ZnO and **is of significant interest in livestock feeding.**

Potentiated zinc oxide is a new form of zinc oxide.

Using a patented manufacturing technology a potentiated form of zinc oxide, HiZox®, has been developed for animal nutrition. Physico-chemical properties are modified: specific particle size and shape **with increased (10 to 15 times higher than conventional sources) specific surface area drastically increases the surface of contact with bacteria.** The high porosity of the powder amplifies the antibacterial activity of this potentiated zinc oxide. Scientific experiments have confirmed its efficacy to manipulate intestinal and faecal microbiota of weaned piglets.

Proof of HiZox's efficacy was reported by the University of Berlin where in an *in vitro* bacterial growth study compared the inhibitory effects of HiZox® and regular zinc oxide on the growth of pathogenic strains of Escherichia coli (fimbriated E. coli PS79/K88/ F4 and PS7/K81/F18). HiZox® showed a significantly stronger inhibitory action on E.coli in neutral (pH 6.5) and acidic conditions (pH 4.6) which mimic the gastro-intestinal pH environment compared to the conventional ZnO source.

Comparison of Zinc Oxides

	Zinc Oxide	Zinc Oxide as HiZox
Dose in piglet diets	3000 ppm (+++++ high)	200-300 ppm (+ low)
Performance	+++++	+++++
Heavy metals	+++	+
Environmental accumulation	+++	+
Nutritional antagonism	+++	+
Bacterial Resistance	+++	+
Cost per MT of feed	++	++

Conclusion

There is growing pressure to reduce the use of antibiotics and pharmacological doses of zinc oxide in piglet diets. Excessive and prolonged use of ZnO are known to create negative consequences: risk of heavy metal contaminations, nutritional antagonisms, environmental pollution and accumulation, bacterial resistance. Nutritionists and producers are seeking feed ingredients and feed additives which can reduce the risk of digestive disorders in critical phases such as the post-weaning period of pigs. HiZox® can be used, in combination with alternatives to antibiotic growth promoters (AGPs), in a preventive way to improve intestinal health and reduce the need for non-sustainable practices. (References available on request)