ZINC OXIDE IN PIGLET DIETS

2. The role of blood Zn levels in growth improvement

BY THE ANIMINE TECHNICAL TEAM. WWW.ANIMINE.EU

Welcome to the second in Animine's series of articles, which will review scientific literature on the effects of the pharmacological dosage of zinc oxide (ZnO) in weaned piglet diets. In the European Union, medicated ZnO will be totally banned from June 2022. It is interesting to note that abroad there is also a growing number of countries following this tendency, such as China, where the supplementation of pharmacological levels of ZnO is already restricted.

The pharmacological dosage of ZnO is well known for its effect on diarrhoea reduction and improved weight gain of weaned piglets. However, even after decades of use, there is still no consensus on its modes of action. This series of articles will review existing scientific literature with a particular focus on its key effects and mechanisms.

It will also be inspired from the latest outcomes of the ZincoSupp research network supervised by Animine. This ambitious scientific programme, involving several renowned universities, addresses the suppression of pharmacological ZnO, while studying the proper supplementation of the potentiated zinc source, HiZox

Relationship between blood Zn concentration and piglet growth performance

An exhaustive literature review was performed from the AniLib database. Out of 151 publications on pharmacological use of ZnO in weaned piglets, 19 papers were selected for the purpose of this review. The filtering criteria were: daily weight gain, blood zinc concentration at the end of 2-6 weeks studies (with focus on 2-3 weeks when possible) and ZnO supplementation levels at 2-3000mg Zn/kg complete diet. The stress of weaning creates anorexia in piglets from the first days after the suckling period. As a consequence of collapsed feed intake, the supply of nutrients becomes very limited at a critical time for the animal. The risk of transitory sub-clinical zinc deficiency appears, which can be compensated by very high dietary Zn concentrations. Pharmacological dosage of ZnO corrects sub-optimal blood zinc levels below 1-2mg/L. Growth improvement is observed with the repletion of Zn circulating pool.

Once minimum daily ingestion of zinc is achieved, blood Zn concentration is tightly regulated, and is stabilised by homoeostatic equilibrium.

When blood Zn level is at the plateau, the effect of ZnO supplementation on body weight gain is less clear, but it is still observed.

Pharmacological dosage of ZnO may restore the Zn status of the weaned piglet, in combination with some non-nutritional functional effects, such as a local action of ZnO in the intestine, through a microbiota modulation. ■

References of selected papers:

Animal Feed Science and Technology	2018
Animal	2015
Animals	2021
Asian Australian JAS	2020
Asian Journal of Animal and Veterinary Advances	2012, 2013
British Journal of Nutrition	2014
Journal of Animal Science	1993, 1996, 1999, 2001, 2002, 2009
Journal of Animal Science and Technology	2014
Journal of Trace Elements in Medicine and Biology	2018
Murdoch University report	2010
KSU Swine Day	2008
Veterinarni Medicina	2015
WUR report	2016

Fig. 1. Correlation between blood Zn levels and average daily gain of weaned piglets fed pharmacological levels of ZnO. First point of each line is a negative control (without ZnO or low dietary Zn concentration) and the last point is pharmacological dosage.