

EFFECT OF ZINC OXIDE AND CHLORTETRACYCLINE ON ANTIBIOTIC RESISTANCE

DEVELOPMENT IN WEANED PIGLET

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Introduction

Chlortetracycline (CTC) and zinc oxide (ZnO) at pharmacological dosage are commonly supplemented in piglet diets in order to improve growth performance, through adjusting gut health and reducing diarrhea during the post-weaning period. However, there is a risk of bacterial resistance development. In this trial, CTC and ZnO were used to evaluate their effects on antibiotic resistance genes.

Material and methods

The trial was performed with 4 experimental diets: 2400 ppm of Zn from standard ZnO vs. 110 ppm of Zn from a potentiated ZnO source (HiZoxR), with or without 300 ppm of CTC. Each treatment consisted of 10 piglets weaned at 25 days. DNA was extracted from faeces (0, 2, 4, 7, 14 d), in order to quantify by qPCR the *Escherichia* group, some antibiotic resistance genes and related genes.

Results

As expected, both groups with high concentrations of ZnO reduced the *Escherichia* group, however low concentrations of the potentiated ZnO and CTC showed the same trend. CTC increased numerically the development of various genes (*tetA*, *bacA*) after 6 days; without CTC, there were numerical (*tetA*) or significant (*bacA*, *zint*) differences between the group fed 2400 ppm of Zn from standard ZnO and the group fed 110 ppm of Zn from potentiated ZnO.

Discussion & conclusion

Both ZnO at high level and CTC increase the development of antibiotic resistance genes, and may have an additive effect on these genes. Despite its antibacterial effect, observed in previous studies, the potentiated ZnO source showed a limited effect on resistance genes, compared to standard ZnO at pharmacological dosage.