

# The Effectiveness of *Macleaya Cordata* Extract (MCE) as an Alternative to Zinc Oxide (ZnO) in the Prevention of Post-Weaning Diarrhea in Piglets

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## Background and Objectives

The high prevalence of post-weaning diarrhea (PWD) in piglets is related to nutritional changes, social stress and insufficient immune competency. The consequences of PWD are not only seen immediately post weaning, but can result in long term poor performance throughout the rearing and fattening phases. Zinc oxide (ZnO) has shown antimicrobial properties at high dosages (2500-3000 ppm) and has been used as a nutritional strategy to prevent PWD. However, environmental concerns with respect to a high zinc excretion have led the European feed legislation to limit the total dietary zinc allowance, so that effective alternatives are needed. The use of organic acids (OA) in feed has been shown to reduce pathogenic pressure<sup>1</sup> and several studies suggest that isoquinoline alkaloids extracted from *Macleaya cordata* show anti-inflammatory properties<sup>2,3</sup>. The aim of this study was to evaluate the effectiveness of OA and of a standardized *Macleaya cordata* extract (MCE) compared to ZnO in reducing PWD in piglets.

## Materials and Methods

A total of 240 weaned piglets (PIC; BW: 6.64 kg; age: 23 days) were evenly divided into four treatment groups (12 pens/treatment, n=5 per pen) for 8 weeks post weaning. Treatment 1 (**NC**) was a negative control with no dietary supplements, treatment 2 (**ZnO**) received 3000 ppm of ZnO for 3 weeks, treatment 3 (**OA**) received 4000 ppm of an OA blend (propionic, butyric, capric and caprylic) and treatment 4 (**MCE**) received MCE containing an alkaloid concentration of 5.25 ppm through the commercial product Sangrovit®. Performance of all animals was evaluated, and diarrhea cases and the medication use were registered (diarrhea was scored at a scale of 1-4 according to the system described by Zhang et al., 2010<sup>4</sup>; piglets receiving score 4 were treated with an antibiotic).

## Results

Performance parameters were similar between treatments during the 8 weeks following weaning. Diarrhea incidence was 4<sup>a</sup>, 19<sup>b</sup>, 33<sup>bc</sup> and 49<sup>c</sup> cases for ZnO, MCE, OA and NC, respectively (ab, ac, bc P≤0.05). ZnO reduced the cost of medication by 91% compared to NC (0.9 USD vs 10.4 USD). MCE was able to reduce the medication cost (4.05 USD) by 61 % and OA (7.03 USD) by 32% compared to NC.

## Discussion and Conclusion

While the supplementation with ZnO yielded the most effective prevention against PWD, the standardized MCE also showed significant improvements compared to the negative control group. Therefore, it can be concluded that the use of MCE can form a valuable part of the strategy to prevent problems with PWD in the post-ZnO era.

## References

<sup>1</sup>Tsiloyiannis et al.: The effect of organic acids on the control of porcine post-weaning diarrhoea.

*Research in Veterinary Science*, Vol. 70, No. 3, 2001

<sup>2</sup>Chaturvedi et al.: Sanguinarine (Pseudochelerythrine) Is a Potent Inhibitor of NF-kB Activation, IkBa Phosphorylation, and Degradation. *Journal of Biological Chemistry*, Vol. 272, No. 48, 1997

<sup>3</sup>Kantas et al.: The effect of a natural feed additive (*Macleaya cordata*), containing sanguinarine, on the performance and health status of weaning pigs. *Animal Science Journal*, Vol. 86, 2015

<sup>4</sup>Zhang et al.: Influences of Phytoncide supplementation on growth performance, nutrient digestibility, blood profiles, diarrhea scores and fecal microflora shedding in weaning pigs. *Asian-Australasian Journal of Animal Sciences*, Vol. 9, 2012