

Effect of Isoquinoline Alkaloids Supplementation in Combination with Organic Acids on Health Status of Post-weaning Pigs

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AIM OF THE STUDY

To evaluate the effect of Isoquinoline Alkaloids and Organic Acids supplementation on diarrhea of post-weaning pigs

INTRODUCTION

Post-weaning diarrhea (PWD) is highly prevalent in modern swine production systems, causing economic losses due to high morbidity, mortality and treatment costs (Fairbrother et al., 2005). Zinc Oxide (ZnO) is used as a nutritional strategy to improve gut health in post-weaning pigs. It is also effective in controlling diarrhea. However, the high doses (2500-3000 ppm) of ZnO required represent a risk for the environment (Debski, 2016). Therefore, there is a need for effective alternatives to the high dosage of ZnO for the control of PWD in weaned piglets.

The use of organic acids (OA), mainly medium chain fatty acids such as Caprylic (C8) and Capric (C10), were effective in reducing pathogenic bacteria in addition to improving growth and performance in pigs (Upadhaya et al., 2014). Additionally, isoquinoline alkaloids (IQ) have demonstrated to have local anti-inflammatory properties (Chaturvedi et al., 1997), and to down-regulate stress response as well as to enhance the intestinal barrier function in pigs (Robbins et al., 2013; Artuso-Ponte et al., 2015).

Our hypothesis was that the use of isoquinoline alkaloids in combination with an organic acid blend would ameliorate the negative impact of weaning stress and improve the fecal scores of post-weaning pigs, as well as reduce the need for antibiotic treatments.

MATERIALS & METHODS

Animals: 240 barrows & female post-weaning piglets (PIC) weaned at 23 ± 2 days of age, initial BW = 6.64 kg

Treatments: 12 pens/treatment; 4 piglets/pen

1. Control (CON; n = 48; basal diet)
2. OA (n = 48; basal diet + 4000 g/ton OA blend)
3. OA+IQ (n = 48; basal diet + 100 g/1000 L of water of soluble IQ for the first 3 days after weaning and 300 g/ton IQ for the total duration of the trial and 4000 g/ton OA blend)
4. IQ (n = 48; basal diet + 100 g/1000 L of water of soluble IQ for the first 3 days after weaning and 300 g/ton IQ for the total duration of the trial)
5. ZnO (n = 48; basal diet + 3000 g/ton ZnO for 3 weeks)

IQ were derived from **Sangrovit® Extra** and **Sangrovit® WS** (Phytobiotics GmbH, Eltville Germany), a natural plant extract from *Macleaya cordata*

Diets & Feeding: Starter (23-42 days of age) & grower diet (42-77 days of age) based on corn and soybean meal

Parameters:

Body Weight and Feed Intake was measured weekly

Fecal scores and diarrhea index were determined daily during the first 2 weeks of the experiment

Medication usage was recorded

Table 1. Diarrhea index and medication usage

	CON	OA	OA+IQ	IQ	ZnO
Diarrhea index	0,50	0,36	0,36	0,21	0,07
# pigs medicated	9 (19%)	6 (13%)	5 (10%)	3 (6%)	2 (4%)

CONCLUSION

✓ Supplementation with IQ, or ZnO reduced the duration and severity of PWD, which is reflected by a decrease in the proportion of animals requiring treatment

✓ A synergistic effect between IQ and OA can be observed on fecal scores, but not on growth performance

✓ IQ supplementation improved FCR by 4.5% and 5.5% as compared to ZnO and CON group respectively during the grower phase

Figure 1. Proportion of pigs with fecal scores 3 and 4 during the first 2 weeks after weaning

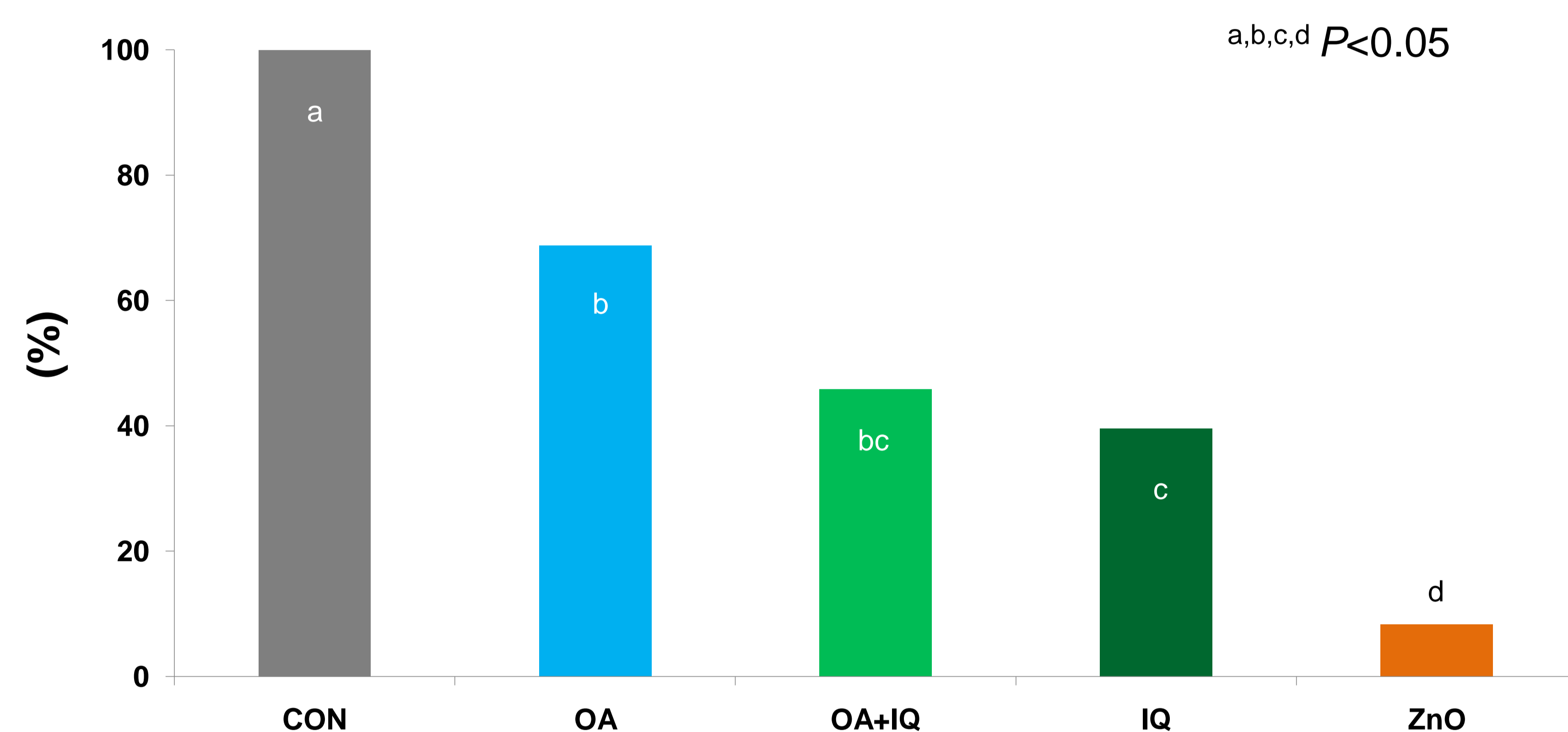
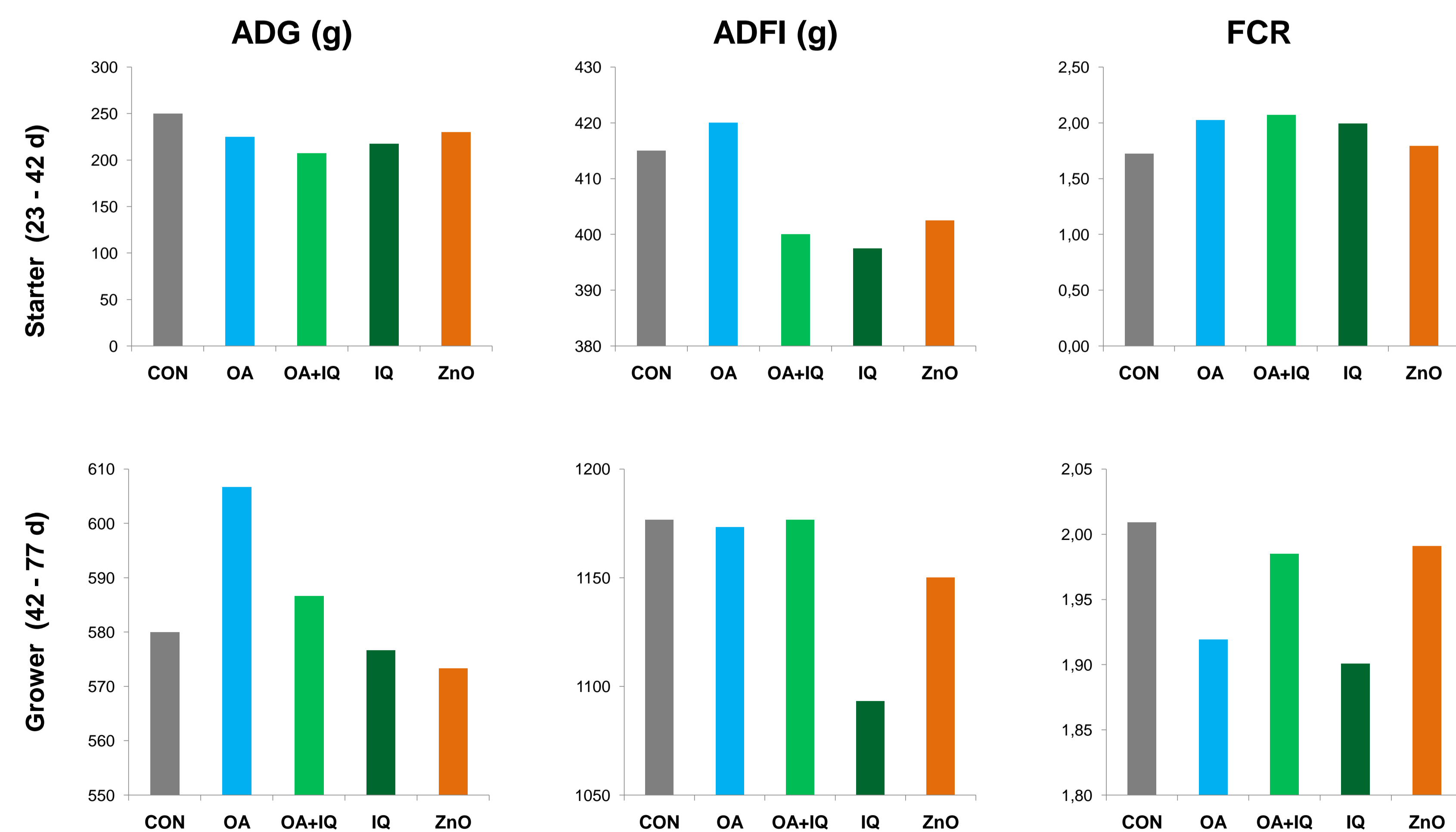


Figure 2. Effect of IQ, OA and ZnO on growth performance (23-77 d of age)



REFERENCES

1. Fairbrother et al., 2005. *Escherichia coli* in postweaning diarrhea in pigs: an update on bacterial types, pathogenesis, and prevention strategies. *Anim Health Res Rev*, 6(1):17-39
2. Debski, B., 2016. Supplementation of pigs diet with zinc and copper as alternative to conventional antimicrobials. *Polish Journal of Veterinary Sciences*, 19(4): 917-924
3. Upadhaya et al., 2014. Protected organic acid blends as an alternative to antibiotics in finishing pigs. *Asian-Australas J Anim Sci*, 27(11): 1600-1607
4. Chaturvedi et al., 1997. Sanguinarine (pseudochelerythrine) is a potent inhibitor of NF-kappaB activation, IkappaBalpha phosphorylation, and degradation. *J Biol Chem*, 272(48):30129-34
5. Robbins et al., 2013. Effects of quaternary benzo(c)phenanthridine alkaloids on growth performance, shedding of organisms, and gastrointestinal tract integrity in pigs inoculated with multidrug-resistant *Salmonella* spp. *American Journal of Veterinary Research*, 74(12):1530-1535
6. Artuso-Ponte et al., 2014. Supplementation with quaternary benzo(c)phenanthridine alkaloids decreased salivary cortisol and *Salmonella* shedding in pigs after transportation to the slaughterhouse. *Foodborne Pathog Dis*, 12(11):891-897