

Diarrhea incidence and serum zinc concentration in weanling pigs fed enzyme treated soy

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Background and objectives: Post-weaning diarrhea is a recurring problem in piglets. Increased serum zinc has been associated with decreased weaning diarrhea, improved growth performance through improved immune response and appetite. Objectives: to evaluate diarrhea incidence and serum zinc in weanling pigs fed enzyme treated soybean meal under commercial farm conditions.

Materials and methods: Two experiments were conducted, 1) *in vitro* experiment to assess zinc solubility as an indicator of availability. In brief, samples (n=4/trt) were incubated for 2 h at 38°C, centrifuged to obtain the liquid phase for zinc analyses. 2) *in vivo* experiment with two treatments on a commercial farm with 864 piglets/treatment. HP 300 and an enzyme treated Test ingredient produced by Hamlet Protein A/S Denmark were used (~19% inclusion rate). Both diets were iso-energetic and contained 177 dig. CP/kg (150 g dig. protein/FEsv) and 500 FTU phytase. No prophylactic pharmaceutical zinc oxide was used. Blood samples were collected at d -7, 1, 7 and 14 post-weaning from the same pig (=24 pigs/treatment) and analyzed for serum zinc. Piglets were fed treatment diets pre-weaning. Faeces was scored daily: from 0 (normal) to 3 (bloody diarrhea). Medical treatment was initiated at score 2.

Results: The solubility of Zn in Test diet was 45% higher compared to HP 300 diet (Table 1). Feed intake was higher on Test diet 15d post-weaning resulting in higher mean zinc intake. Weight gain was better in pigs fed the Test diet; however, FCR was lower in the HP 300 diet. Diarrhea peaked on day 5, did not differ between diets and was not extensive in this experiment (Figure 1, 1). Serum zinc decreased post weaning but was higher (P = 0.07) in pigs fed the Test diet d1 post weaning (Figure 1, 2). At d15, serum zinc showed pre-weaning values.

Table 1. Zinc solubility, total zinc intake and growth performance for 15 days post-weaning.

| Diets | Zn, mg/kg | Zn sol,% | ADFI,g/d | Zn intake, mg/d | Weight, kg | ADG, g/d | FCR |
|--------|-----------|----------|----------|-----------------|------------|----------|------|
| Test | 158 | 11 | 242 | 38.24 | 6.49 | 207 | 1.17 |
| HP 300 | 171 | 6 | 206 | 35.23 | 6.54 | 198 | 1.04 |

Note: ADFI: Average daily feed intake; ADG: Average daily gain.

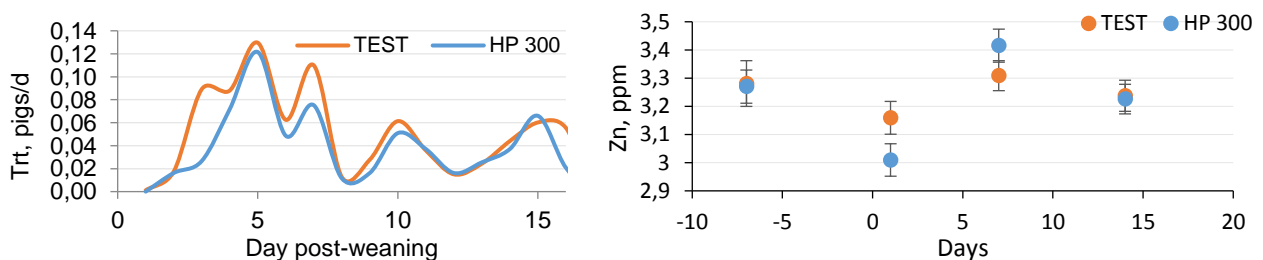


Figure 1. Number of piglets treated per day (1) and serum zinc concentration (2) in test and HP 300 diets.

Conclusions and discussion: Enzyme treatment of soybean almost doubled zinc solubility and serum zinc increased in pigs immediately after weaning. This resulted in improved feed intake and gain. The observed serum zinc levels were similar to levels reported after feeding of 2,500-3,000 ppm ZnO post-weaning (Poulsen, 1995; Hill *et al.*, 2001). Diets based on the enzyme treated product or commercial HP 300 (without pharmaceutical zinc) resulted in low incidence of weaning diarrhea.

References

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