

Impact of high zinc oxide supplementation or lignocellulose supplement on chronic markers of intestinal inflammation and growth of weaned piglets.

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The objective of this project was to study the effect of high zinc oxide (ZO) supplementation and fiber supplement from lignocellulose (LIGCEL) on chronic markers of intestinal inflammation and growth of weaned piglets. At weaning (21d), 150 piglets (6.39 ± 0.276 kg) were transferred from a farrowing farm to a nursery farm where they were divided into 30 pens of 5 piglets per pen according to their weanling weight. Each pen was assigned to one of the following three treatments: Control (CON, 150 mg/kg of zinc), ZO (2,500 mg/kg of zinc), and LIGCEL (CON+3% lignocellulose). ZO and LIGCEL supplements were added to a phase 1 diet. The experimental diets (phase 1) were distributed for 14 days. Subsequently, all piglets received the same diets from phases 2 and 3 for two periods of 14 days. During the experiment, piglets were weighed upon arrival and after phases 1, 2, and 3. The feed was distributed every day and the total quantities calculated for each of the feeding phases. The average daily gain (ADG), average daily feed intake (ADFI) and feed conversion (FC) were subsequently calculated. On days 6 and 13, the blood of two piglets per pen was collected to determine the content of D-lactate and diamine oxidase (DAO). Fecal samples from these two piglets were also taken to evaluate the calprotectin and neopterin contents. During phase 1, ADG was higher for ZO piglets compared to the CON animals with an intermediate value for the LIGCEL group ($P < 0.001$). The ADFI was higher for the ZO compared to the CON and LIGCEL treatments ($P < 0.003$). Piglets in the ZO and LIGNOCELL treatments had a lower FC than those in the CON group ($P < 0.001$). During phase 2, only the FC was higher for the ZO and LIGCEL treatments compared to CON animals ($P < 0.013$). During phase 3, growth performances were not affected by the dietary treatments. For the entire experiment, ZO piglets had a higher ADG than those in the CON group with an intermediate value for LIGCEL treatment ($P < 0.019$). D-lactate decreased from day 6 to 13 while DAO increased ($P < 0.001$). The DAO was also higher for ZO and LIGCELL piglets compared to CON animals ($P < 0.001$). Neopterin was higher for ZO treatment but only on day 13 (Trt \times day, $P < 0.010$). Finally, calprotectin decreased from day 6 to 13 ($P < 0.001$) but was not affected by dietary treatments. In conclusion, ZO and LIGCEL fiber act positively on growth by modulating markers of intestinal inflammation. LIGCEL fiber could therefore be an alternative to ZO in the diet of weaned piglets.

Keywords: piglet, weaning, zinc oxide, fiber, inflammation, growth.