

Impact of zinc and fiber supplementation in weaned piglet diet on intestinal mucosal growth and inflammation

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Weaning piglets leads to environmental and dietary changes, causing intestinal and growth issues. The use of antibiotics and high-dose zinc to prevent these problems is common but poses environmental and health risks. Dietary fibers are proposed as a natural alternative, but their effectiveness remains unproven. One hundred twenty piglets were divided into five groups to evaluate two fiber sources (lignocellulose (LIGCEL, 3%) and oat hulls (OATHULL, 4%)) and their combination (LIGCEL+OATHULL, 1.5+2%), compared to a control group (CON) and a group receiving a high zinc oxide diet (2,500 mg/kg, ZnO). These experimental diets were administered to the piglets for 14 days, then all animals received the same two-phase diets (14-28 and 28-42 days). Body weight (BW), average daily gain (ADG), and average daily feed intake (ADFI) were measured during experimental period as well as the fecal concentration of intestinal inflammatory markers on days 7 and 14. On day 14, piglets in the ZnO group had higher BW than those in other treatments, except for the LIGCEL treatment ($P=0.006$). The ZnO treatment also increased ADG and ADFI from days 1 to 14 ($P<0.05$). However, on day 42, no treatment influenced BW of piglets. Neopterin (an inflammation marker) decreased between days 7 and 14, except for ZnO group, where it increased ($P=0.001$). Calprotectin tended to be lower for the CON and OATHULL groups but only on day 7 ($P=0.059$).

Implications: ZnO supplementation increased ADG but also fecal neopterin, indicating increased intestinal inflammation after 14 days post-weaning. The LIGCEL supplement moderately improved growth without affecting intestinal inflammation. Ultimately, all treatments led to similar BW at 42 days, suggesting growth compensation after weaning under good rearing conditions.