

## Effects of Yeast Culture Supplementation on Growth Performance, Intestinal Health, and Immune Response of Nursery Pigs

Y. B. Shen, X. S. Piao, S. W. Kim, L. Wang, P. Liu, I. Yoon and Y. G. Zhen

**Abstract:** A total of 216 weaning pigs were used in 2 experiments to determine the effects of dietary supplementation of yeast culture (YC) at different dose levels on the growth performance, nutrient digestibility, intestinal morphology, intestinal microflora, and immune response in weanling pigs and to determine whether YC can be a candidate to replace antibiotic growth promoters (AGP). In Exp. 1, 192 pigs ( $7.5 \pm 0.2$  kg of BW) weaned at 28 d of age were randomly allotted to 6 treatments: 1) control (without AGP or YC); 2) AGP (chlortetracycline, 80 mg/kg); 3) 2.5 g/kg of YC (Yeast Culture); 4) 5 g/kg of YC; 5) 10 g/kg of YC; and 6) 20 g/kg of YC. Each treatment had 8 replicated pens with 4 pigs per pen. Pigs were fed the experimental diets for 21 d. Average daily gain of pigs fed 5 g/kg of YC was greater ( $P < 0.05$ ) than that of pigs in the control and other YC groups. However, there was no difference between the YC and AGP group. Pigs supplemented with 5 g/kg of YC, 10 g/kg of YC, and AGP had a greater ( $P < 0.01$ ) ADFI than the control; however, G: F was not affected by treatment. Thus, 5 g/kg of YC supplementation level was chosen for Exp. 2. In Exp. 2, to elucidate the mode of action of YC, 24 nursery pigs ( $5.8 \pm 0.1$  kg of BW; 21 d of age) were randomly allotted into 3 treatments for a 21-d trial. Treatments consisted of 1) control (without AGP or YC), 2) AGP, and 3) 5 g/kg of YC. Blood samples were collected weekly to measure CD4+, CD8+ percentage, and blood cytokine content. All pigs were harvested to determine treatment effects on gut microbiota, morphology, and immune function. Dietary supplementation of 5 g/kg of YC improved ( $P < 0.05$ ) ADG of pigs compared with the control group, but performance of pigs fed YC was similar to those fed AGP. Pigs receiving 5 g/kg of YC had greater ( $P < 0.05$ ) digestibility of DM, CP, GE, and jejunal villus height and villus height: crypt depth ratio ( $P < 0.05$ ) compared with pigs fed the control diet. However, no differences in performance, digestibility, or gut morphology were observed between pigs fed YC and AGP. Gut interferon (IFN)- $\gamma$  concentrations were greater ( $P < 0.01$ ) for pigs supplemented with YC compared with control pigs and pigs supplemented with AGP on d 21. However, plasma IFN- $\gamma$  concentrations were decreased ( $P < 0.01$ ) in pigs supplemented with YC and AGP compared with control pigs on d 7, and CD4+ was decreased ( $P < 0.01$ ) in pigs supplemented with YC and AGP on d 14. Results indicate that dietary YC supplementation at 5 g/kg had a positive effect on growth performance of nursery pigs by improving jejunal villus height and villus height: crypt depth ratio and by modulating gut immune response. The comparable effect of 5 g/kg of YC supplementation and AGP on the growth performance of nursery pigs indicates that YC may be a good candidate as an antibiotic alternative.

**Key words:** growth performance, immunity, microflora, morphology, yeast culture