

ANIMAL SCIENCE

Title: Effect of lysozyme or antibiotics in ameliorating the effects of an indirect diseases challenge –
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SCIENTIFIC ABSTRACT

Lysozyme is a 1,4- β -N-acetylmuramidase that has antimicrobial properties. The objective of this study was to determine the effect of lysozyme and antibiotics on growth performance and immune response during an indirect disease challenge. Two replicates of 600 pigs each were weaned from the sow at 26 d of age, blocked by litter and gender, and then randomly assigned to one of 24 pens in either a nursery room that had been fully disinfected or a nursery room left unclean since the previous group of pigs. Within a room, pigs were randomly assigned to either control diets (C; 2 phase nursery regime), control diets + antibiotics (C + A; chlortetracycline/Denegard), or control diets + lysozyme (C + Lyso; 100 mg/kg diet). Pig weights and feed disappearance were measured and blood was collected on d 0, 14, and 28 of treatment. A group of 20 pigs were killed at 24 d of age for initial body composition analysis and 10 pigs of median weight were killed per diet room combination for body composition analysis after 28 d of treatment. Control + A and C + Lyso fed pigs grew at a faster rate for the 28 d study (318 ± 14 , 320 ± 15 , vs. 288 ± 15 g/d, respectively; $P < 0.05$), regardless of immune status ($P > 0.05$). The indirect immune challenge did not alter growth performance from d 0 to 14 of treatment, but decreased ADG from d 14 to 28 of the study (415 ± 15 vs. 445 ± 13 ; $P < 0.05$). Feed intake was not altered by the immune challenge ($P > 0.61$) or dietary treatments ($P > 0.10$), but feed efficiency was worsened by the indirect immune challenge ($P < 0.05$) and improved by both C + A and C + Lyso diets ($P < 0.01$). The immune challenge did not alter nutrient accretion ($P > 0.25$), but both C + A and C + Lyso the accretion of whole-body lipid ($P < 0.01$) and protein ($P < 0.09$). Blood levels of tumor necrosis factor- α (TNF- α , $P < 0.01$), haptoglobin ($P < 0.09$), and C-reactive protein (CRP, $P < 0.01$) were higher due to the indirect immune challenge, compared to pigs reared in the clean nursery ($P < 0.05$). In addition, pigs consuming antibiotics or lysozyme had lower TNF- α , haptoglobin, and CRP compared to control pigs, regardless of nursery environment ($P < 0.04$). Thus, lysozyme or antibiotics improve pig performance during an indirect immune challenge. Thus, lysozyme is a suitable alternative to antibiotics in swine nursery diets, and lysozyme ameliorates the effects of a chronic immune challenge.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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