RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: A comparison of administration routes of direct fed microbials to nursery pigs, and the effects on growth performance and gut health - **NPB#: 04-097**

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Date Received: August 10, 2005

II. Abstract:

One hundred eighty, crossbred, weanling pigs were used in a 5-wk experiment to investigate the effects of administering a bolus dose of direct fed microbials (DFM) at weaning and/or supplementing the feed with DFM on growth performance and gastrointestinal morphology and physiology. Three dietary phases were fed during the experiment. All diets were formulated to contain adequate levels of all nutrients (NRC, 1998). Treatments included: 1) negative control with no supplementation of DFM or antibiotics, 2) Trt. 1 + DFM administered in a bolus dose at weaning, 3) Trt. 1 + DFM administered through the feed for d 1-35, 4) Trt. 1 + DFM administered in a bolus dose at weaning, and through the feed for d 1-35, and 5) Trt. 1 + in feed antibiotics. Six pigs were housed in each pen with 6 pens per treatment. Individual BW and pen feed disappearance were recorded weekly. Eight pigs (4 barrows and 4 gilts) were euthanized, by asphyxiation with CO_2 followed by exsanguination on d 0, and one pig per pen (3 barrows and 3 gilt/trt) was euthanized on d 7, 20, and 34 for collection of duodenal (15 cm post pylorus) and ileal (15 cm prior to the ileo-cecal junction) tissue. In addition, thymus weight and total empty stomach, small intestine, and large intestine weights were recorded. Pigs were injected i.p. with 5-bromo-2′-deoxyuridine (BrdU, Sigma Chemical Co., St. Louis, MO) (10 mg:kg BW) to allow for estimation of enterocyte migration rate. Overall, there was no effect of treatment on ADG. Including antibiotics in the diet improved ADG ($P < .05$) during phase 3 compared to pigs fed the negative control diet. Administering a bolus dose of DFM to pigs at weaning with or without subsequent provision of DFM in the feed resulted in similar growth performance to pigs fed either the negative control diet or the diet containing antibiotics. However, providing DFM in the feed alone, resulted in a reduced ADG during phases 1 ($P < .05$) and 2 ($P < .10$) compared to pigs fed the antibiotic containing diet. Overall feed intake was higher for pigs fed the antibiotic diet compared to pigs fed the negative control diet, the diet with DFM to pigs provided a bolus DFM dose at weaning. Pigs provided a bolus dose of DFM at weaning and provided subsequent DFM in the feed had similar feed intakes to pigs fed the antibiotic containing diet. On d 21, pigs fed the diet with antibiotics had deeper duodenal crypts ($P < 0.05$) compared to pigs fed the negative control diet with or without administration of a bolus dose of DFM at weaning. On d 35, duodenal crypts remained deeper ($P < 0.10$) for pigs fed the diet with antibiotics compared to pigs receiving the bolus dose of DFM at weaning with no subsequent treatment. Ileal crypt depths were greater ($P < 0.10$) for pigs fed the antibiotic containing diet compared to all other treatments on d 7. A similar pattern was observed on d 35 ($P <$

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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