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Digest



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February 1990 No. 184

EFFECT OF MEAT AND BONE MEAL CONTAINING SALMONELLA ON
GASTROINTESTINAL MICROFLORA AND SWINE PERFORMANCE

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This is the Abstract of an important paper and if you would like the full report please contact me - Dr. Bisplinghoff.

ABSTRACT

Three research studies were conducted to determine the effects of feeding diets containing meat and bone meal on the clinical signs (i.e. diarrhea), gastrointestinal bacterial cultures (Salmonella sp., E. coli, Lactobacillus sp.) and performance of the pig. Meat and bone meal was included at 8% of the diet from commercial sources which contained Salmonella sp.

In the first experiment, 24 weanling pigs were randomly allotted to four dietary treatments, with six pigs per treatment. Diets were (1) corn-soy control without added fat, (2) corn-soy control with 5% animal-vegetable fat, (3) corn-soy with meat and bone meal (not autoclaved) and (4) corn-soy with meat and bone meal (autoclaved). Rectal swabs were obtained at different times during the growth trial and analyzed for Salmonella sp. At the end of the four week trial, gastrointestinal lumen contents were obtained from the duodenum, cecum and colon and analyzed for E.coli, Lactobacillus short chained volatile fatty acids, pH and dry matter.

In the second experiment, all phases in the life cycle of the pig were studied. Diets throughout all phases included a (1) corn-soy control and a (2) corn-soy-meat and

bone meal (8%) from two commercial sources. A total of 24 sows and gilts were allotted to the experimental treatments. During the nursery phase, 96 pigs were selected from the farrowings and individually fed the experimental diets. After the nursery phase, 48 pigs were moved to individual pens and fed the experimental diets until market. Rectal swabs were obtained as in experiment one. Gastro-intestinal lumen contents were obtained from pigs at weaning, nursery and market from the stomach, small intestine, cecum and colon and analyzed as in experiment one.

In experiment three, 24 weanling pigs were assigned to three dietary treatments, with 8 pigs per treatment. Diets were (1) corn-soy control without meat and bone meal, (2) corn-soy control with meat and bone meal (not inoculated) and (3) corn-soy control with meat and bone meal (inoculated with additional Salmonella sp.) Inoculated meat and bone meal was obtained by inoculating and growing a blend of Salmonella montevideo, Salmonella anatum and Salmonella senftenberg on a commercial source of meat and bone meal. Rectal swabs were obtained as in experiment one and gastro-intestinal lumen contents were taken at the end of the trial and analyzed as in previous experiments.

Results of this research showed that the existence of naturally occurring strains of Salmonella sp. in meat and bone meal added to the diet at 8% did not adversely affect weanling pig average daily gain, feed consumption and feed efficiency. There was no difference between treatment groups in clinical signs or shedding of Salmonella sp. during this study, as verified by rectal swab tests. This data was further verified by Salmonella sp. tests on contents of the intestinal tract contents at the end of each trial. In the first nursery study, intestinal content pH, dry matter, total anaerobic contents and most volatile fatty acid concentrations were not significantly affected by dietary treatments. However, there were trends towards changes in anaerobic bacterial concentrations and certain VFAs, especially with the autoclaved meat and bone meal diet.

The present of 8% meat and bone meal in swine diets throughout the life cycle of the pig did not adversely affect performance of gestating and lactating sows and gilts and nursery pigs. During the growing-finishing phase, additional lysine was required to maintain performance. Meat and bone meal additions tended to increase Lactobacillus contents and decrease E.coli contents in the intestinal tract of the pig.

Inoculating the meat and bone meal with the three most commonly found Salmonella sp. organisms in natural sources at a higher level did not adversely affect pig performance or health. Investigation of the intestinal contents resulted in no major Salmonella sp. colonization in the pigs. Meat and bone meal in the diet increased Lactobacillus counts and reduced E.coli in the intestinal contents. Dry matter of intestinal contents were higher in pigs fed meat and bone meal as compared to a corn-soy control diet.