

**Title:** Evaluation of antimicrobial alternatives to reduce the development of antibiotic resistance - NPB#02-084

**Investigator:** Darryl Ragland, DVM, PhD

**Institution:** Purdue University, School of Veterinary Medicine

**Date Received:** July 17, 2003

**Abstract:** A 35-day growth assay was conducted to assess the effect of inorganic minerals and probiotic feed additives on growth performance and development of antibiotic resistance in nursery pigs. Ninety six pigs, with an average weight of 13.11 pounds and ranging in age from 18 to 20 days of age were randomly assigned to six experimental treatments. Experimental treatments consisted of a non-medicated basal diet (control diet), and diets supplemented with Mecadox at 50 g/ton (positive control), copper sulfate at 250 ppm and zinc oxide at 3000 ppm. Two diets were supplemented with BioPlus 2B<sup>®</sup>, a probiotic feed additive consisting of spores of *Bacillus licheniformis* and *Bacillus subtilis* at 1.1 million spores/gram of feed and 1.3 million spores/gram of feed, respectively. Pigs were weighed weekly to assess growth. Feed added to feeders was recorded and feeder weights were obtained on days 21 and 35 of the study to assess feed consumption. Rectal swabs were collected from pigs on days 0, 21 and 35 of the study for isolation of enteric bacteria belonging to the genus *Enterococcus* to determine antibiotic resistance resulting from the experimental treatments. The non-antimicrobial feed additives failed to improve growth rate or feed efficiency in comparison to the non-medicated control diet. Furthermore, the diet supplemented with Mecadox failed to support an increase in growth rate compared to the control diet. The non-antimicrobial feed additives stimulated an increase in feed consumption of the nursery diets with the greatest feed intakes associated with the diet supplemented with zinc oxide ( $P < 0.05$ ). Consumption of the non-antimicrobial feed additives did not result in an elevation of minimum inhibitory concentrations (MIC) above base line levels measured at the initiation of the study. Numerical increases in MIC were observed for the control and Mecadox-supplemented diets, however, the increases failed to achieve significance ( $P > 0.05$ ). With regards to performance, results of the present study concur with results of other studies where growth responses to non-antimicrobial feed additives tend to be variable, with improvements in feed intake and feed efficiency being observed more commonly. With regards to antibiotic resistance, consumption of the non-antimicrobial feed additives did not promote an increase in resistance of enterococcus isolates to vancomycin.

*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*

**For more information contact:**

**National Pork Board, P.O. Box 9114, Des Moines, Iowa USA**

800-456-7675, Fax: 515-223-2646, E-Mail: [porkboard@porkboard.org](mailto:porkboard@porkboard.org), Web: <http://www.porkboard.org/>