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Enhanced Survivability of Very Young Nursery Reared Piglets Treated with a Porcine Derived Competitive Exclusion Culture

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Introduction Pork production in certain regions of the U.S. is being curtailed due to environmental concerns and those in the industry wishing to expand production are under increased pressure to do so by maximizing survivability of all pigs born, particularly those with a lessened ability to compete for maternal nourishment (i.e., small birth weight piglets). Rearing of weaker piglets in nurseries, beginning as early as 24 hr of age, is one possible strategy to ensuring that these have ample opportunity for nourishment but at this young age the immaturity of the gut flora may predispose these piglets to certain enteric and systemic diseases. Presently, we report results from two separate experiments designed to test if competitive exclusion, which facilitates early establishment of a mature gut flora, could provide a measure of protection to piglets reared in this manner.

Materials and Methods Piglets from two sows were treated at birth (via oral gavage) with 5 ml of a porcine derived competitive exclusion culture and piglets from two other sows served as untreated controls. The competitive exclusion culture (designated as pCF1) was propagated from cecal contents of a healthy adult pig and was maintained in steady state via continuous flow culture methodology. At 48 hr of age, the piglets were removed from their sows and placed in a nursery where they were provided ad libitum access to liquid milk replacer. Just prior to placement in the nursery, the piglets were orally challenged with approximately 10^5 colony forming units of a

novobiocin and nalidixic acid resistant strain of *Salmonellae choleraesuis*. Specimens collected from some of the piglets at necropsy were cultured qualitatively for *S. choleraesuis* via preenrichment in GN-Hajna broth, further enrichment in Rappaport-Vassiliadis broth and selective differentiation on Brilliant Green Agar containing 25 Tg novobiocin/ml and 20 Tg nalidixic acid/ml.

Results and Discussion In the first experiment, mortality among the pCF1 treated litter (n=5) and untreated litter (n=7) was 20 and 57%, respectively, by seven days post challenge. At this time the surviving piglets, which showed no ill effects, were euthanized and necropsied for collection of tonsils, ileocolic lymph nodes and cecal contents. Upon bacteriological cultivation of these samples, we recovered *S. choleraesuis* from some but not all of the nonsickened piglets (2 of 4 pCF1 treated; 1 of 3 untreated). In the second experiment, 100% (10 of 10) of the control piglets succumbed by 4 days post challenge whereas only 40% (2 of 5) of the pCF1 treated piglets had died. None of the remaining piglets exhibited signs of disease throughout the experiment which was concluded 18 days post challenge.

Summary These observations demonstrate that administration of a porcine derived competitive exclusion culture (pCF1) provides protection to young pigs which may make nursery rearing of very young pigs a feasible way to increase productivity.