# RESEARCH ABSTRACT

## SWINE HEALTH

**Title:** The Use of Probiotics as an Aid in the Control of Clostridium difficile Associated Disease in Neonatal Pigs - **NPB #12-188**

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**Scientific Abstract:**

The effect of the use of early oral administration of probiotics, either a non-toxigenic *Clostridium difficile* or *Lactobacillus spp*, to newborn piglets would control disease after experimental infection with *C. difficile*. Four replicates of the experimental design were conducted involving a total of 150 new born, caesarian derived piglets. Each replicate divided piglets into 6 different study groups. GROUP 1 negative control, GROUP 2 piglets only received non-toxigenic *C. difficile* strain, GROPU 3 piglets received only probiotic yogurt, GROUP 4 positive control (challenged with toxigenic *C. difficile* strain), GROUP 5 animals received the probiotic non-toxigenic *C. difficile* strain and then challenged with the toxigenic *C. difficile* strain, GROUP 6 received probiotic yogurt and then challenge with the toxigenic *C. difficile* strain. Piglets were individually housed with non-challenged piglets (Groups 1 -3) being house in separate airspace than challenged piglets (Groups 4-6). Piglets were administered the probiotic 4 hours post birth and challenged 16 hours later with a 4+ toxin producing filed isolate and euthanized 72 hours post-challenge. At necropsy, gross observations at necropsy included 1) body condition, 2) dehydration status, 3) perineal fecal staining, 5) consistency of colonic contents, 6) mesocolonic edema, and the presence of 7) visible colonic luminal necrosis. Fresh and formalin fixed tissues including ileum, jejunum, descending colon, cecum, and a cross section of spiral colon were collected for culture and histopathologic examination. Rectal swabs collected prior to inoculation and pooled colon and cecum contents collected at necropsy were assayed for *C. difficile* toxins using a commercially available toxin ELISA. For statistical analysis, three categories of scores were compared: 1) clinical signs, 2) ELISA results and mesocolonic edema, and 3) microscopic lesions. Clinical signs scores were created by summing scores for body condition, hydration status, and perineum staining. Overall statistical evaluation of clinical signs scores from study groups revealed no statistical difference ($P>0.05$). Group 4 presented significant higher scores when compared to Groups 1, 2 and 5 ($P= 0.04$, 0.018 and 0.002 respectively. Histopathologic examination revealed classic CDI microscopic lesions characterized by variable numbers of intestinal only observed within colon and cecum. Group 4 had significant higher microscopic scores when compared to Groups 2 ($P=0.005$) and 5 ($P=0.02$). Analysis of data indicated that mesocolonic edema, ELISA toxin levels and histologic lesions are highly and significant correlated ($P=0.001$). Under our experimental conditions, the use of non-toxigenic *C. difficile* probiotic was effective in minimizing the histologic lesions associated with *C. difficile* infection.