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## Effects of a Water Soluble Plasma Protein Product on Weanling Pig Performance and Health With and Without *Escherichia coli* Challenge.

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Two trials were conducted to evaluate the effect of a water soluble source of plasma proteins (WSPP) offered to newly weaned pigs on pig performance and health. In experiment one, 300 pigs 5.3 kg initial body weight and 17.5 days of age were allotted to treatments by weight with 25 pigs/pen and 6 replications/treatment. Experimental treatments applied included a typical dry pelleted 2 phase nursery program with and without the WSPP product supplied through the water. Total lysine content of the diets were 1.65 and 1.30% for phases one and two. Spray-dried animal plasma was included in the phase one diet at a level of 5%. Pigs were fed each of the two diets for 7 of the fourteen day trial. WSPP was supplied through the water lines and nipple waterers for 14 days using a commercially available proportional dispenser. Compared to day 0-7 the concentration delivered was reduced by 50% during day 7-14. During the initial 7 days, pigs receiving the WSPP had improved average daily gain (ADG) and gain/feed (G/F) ( $P < .01$ ) compared to the controls. Relative improvements in each measure were 23 and 17.6% for ADG (.156 vs .192 kg/day) and GF (1.08 vs 1.27). Overall, day 0-14, ADG (.229 vs .250 kg/day) and GF (.93 vs 1.0) was improved ( $P < .01$ ) for pigs receiving WSPP compared to controls.

In experiment two, 30 pigs obtained from a SEW sow herd with a history of being negative for clinical edema disease were selected and held at the source farm for 7 days. On arrival to the isolation facility, all pigs were sorted according to weight and randomly allotted to six separate isolation rooms with 5 pigs/room. Treatments included a group challenged with non pathogenic *Escherichia coli* strain 123 (C123), a group challenged with *Escherichia*

*coli* strain S1191 (CC) and an S1191 challenged group offered WSPP through the water (CWS). Feed offered was devoid of antibiotics or plasma.

Challenge cultures of chloramphenicol-resistant *Escherichia coli* S1191 containing the edema disease-causing shiga-like toxin IIe and heat-stable enterotoxin a (Sta) genes was inoculated and grown overnight under antibiotic suppression (50 ug/ml chloramphenicol) in two 100 ml aliquots of TSB media at 37°C. For the C123 group, non-pathogenic *Escherichia coli* strain 123 was inoculated and grown overnight in one 100 ml aliquot of TSB media at 37°C. Cultures were then spun down, re-suspended in 20 ml TSB with 15% glycerol, and stored at -72°C. On day 6, pigs in both CC (n=10) and CWS groups (n=10) were administered  $1.5 \times 10^{10}$  CFU of strain S1191 per os via gel capsule. Strain 123 was given to C123 groups (n=10) at the same dose and via the same route of administration. Rectal swabs were taken from all pigs on days 2 and 8. On day 2, swabs were streaked to 5% sheep blood agar plates and incubated overnight at 37°C. All plates were submitted to Iowa State University for PCR analysis of hemolytic suspect colonies. On day 8, swabs were streaked to 5% sheep blood agar plates with 50 ug/ml chloramphenicol to test for shedding of strain S1191. All C123 plates containing colonies were sent to Iowa State University for PCR analysis. Fecal scores and body temperatures were recorded for each pig on all days except day 0. The following system was used for individual fecal scoring: firm = 0; pudding = 1; pasty = 2; watery = 3. Temperatures were taken rectally with a digital thermometer. Pig weights, feed data were collected on day 0 and 18. Water disappearance was monitored daily. All rectal swabs taken on day two

were negative for any suspect colonies when analyzed. Rectal swabs taken on day 8 verified shedding of chloramphenicol-resistant microorganisms by CC and CWS groups while all pigs in the C123 group were not.

Fecal scores were similar through day 9 of the trial. On days 10 through 18 fecal scores of CC pigs were elevated compared to CWS or C123 pigs. ADG of CWS pigs was improved ( $P < .05$ ) compared to CC pigs and similar ( $P > .05$ ) to C123 pigs. ADG for the 18 d period were .33, .24 and .38 kg/day for C123, CC and CWS pigs, respectively. Water disappearance was greater ( $P < .09$ ) for CWS compared to CC pigs and was .93 and 1.52 liters/d/pig. These experiments suggest that WSPP improves pig performance when administered with and without plasma proteins in the feed and that WSPP may reduce the morbidity of pigs challenged with pathogenic *Escherichia coli*.