

RESEARCH BRIEF

CAUSES OF POST-WEANING DIARRHEA IN PIGS

SWINE



The causes of Post-Weaning Diarrhea (PWD) are multifactorial and the exact cause may not be clearly identified (Fig. 1). However, the occurrence of PWD in pigs involves interactions between the sow, piglet, environment, ETEC or EPEC bacteria, other co-infections, and livestock management.

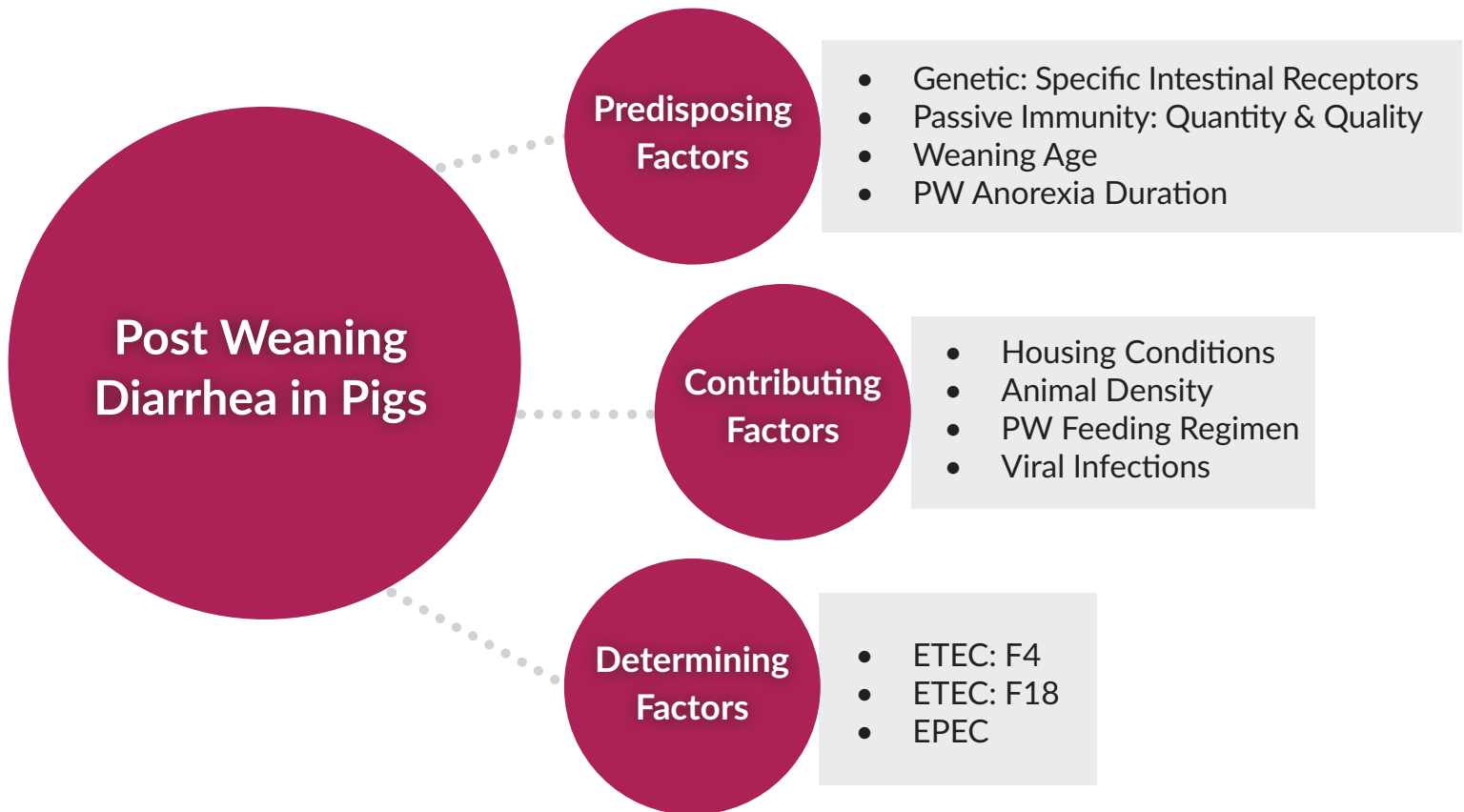


Fig. 1 The multifactorial genesis of PWD in pigs involves interaction between predisposing, contributing and determining factors. PW Post weaning, ETEC enterotoxigenic Escherichia coli, EPEC enteropathogenic Escherichia coli.





WHAT IS E. COLI?

Escherichia coli is a gram negative bacteria belonging to the family Enterobacteriaceae and are part of the normal microflora typically found in pigs. However, certain strains of *E. coli* can be pathogenic and cause neonatal and post-weaning diarrhea, which are common causes of Colibacillosis and mortality in nursing and weaned pigs worldwide.

Colibacillosis is a diarrhea associated with pathogenic *Escherichia coli* that occurs in piglets within a few days after birth through several days after weaning. Many outbreaks can develop within the first week after birth, while others occur later during the nursing period. Still others occur about 1-4 weeks after weaning or following abrupt changes in environment or nutrition.

Pathogenic *E. coli* strains are generally classified as enterotoxigenic (ETEC) or enteropathogenic (EPEC).

ECONOMIC IMPACT OF POST-WEANING DIARRRHEA

Post-weaning diarrhea is an economically important enteric disease in pigs causing financial losses. This disease occurs most frequently within 2 weeks after weaning and is characterized by a profuse diarrhea, dehydration, significant mortality and loss of body weight of surviving pigs. Mortality associated with this disease may reach 20–30% over a 1- to 2-month time span among infected weaned pigs during acute outbreaks of PWD.



HOW SPRAY DRIED PLASMA HELPS

Multiple studies demonstrate that adding spray dried plasma (SDP) to pig diets leads to increased growth performance, reduced inflammation, reduced diarrhea and improved average daily gain and survival.

Across nine ETEC challenge studies, piglets fed diets containing SDP showed improved growth and reduced diarrhea. In one study, research demonstrated that feeding piglets a diet containing SDP improved growth and protected against enterotoxigenic Escherichia coli K88 infection by maintaining mucosal integrity, enhancing specific antibody defense, and decreasing expression of inflammatory cytokines in the intestine.

ETEC Challenge	SDP Impact	Author
E. coli, F18	↑ ADG, ↓ diarrhea	Borg et al.
E. coli, K88	↑ ADG, ↓ mortality	Bosi et al.
E. coli, K88	↑ ADG, ↓ inflammation	Bosi et al.
E. coli, K99	↑ ADG	Torrallordona et al.
E. coli, K99	↑ ADG	Campbell et al.
E. coli, K99	↑ ADG, lactobacilli	Torrallordona et al.
E. coli, F18	↓ diarrhea	Nollet et al.
E. coli, O139:K82	↑ ADG, ↓ diarrhea	Van Dijk et al.
E. coli, K88	↓ diarrhea	Owusu-Asiedu

SDP & ZNO REDUCES DIARRHEA

Results of several additional studies conclude that SDP can be considered a valid alternative to use of antibiotics or supplemental ZnO in feed to help control PWD.

Pigs (10d old) were orally challenged with ETEC (K88) at D7

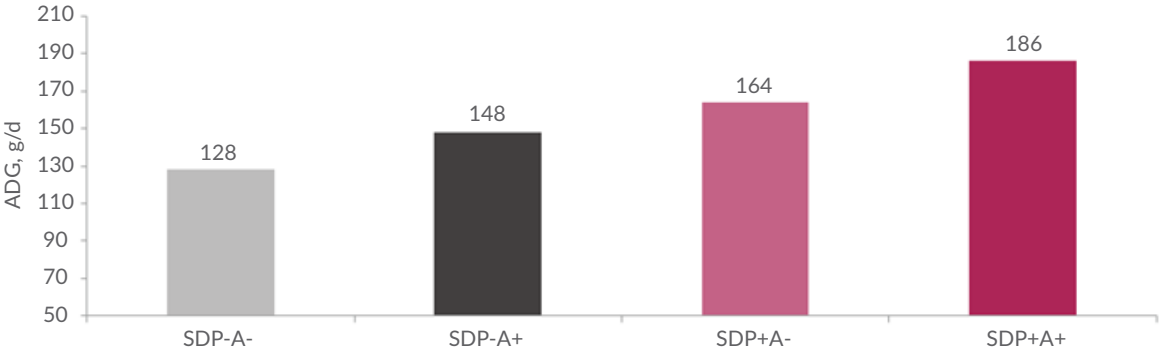
Parameters	Control	SDP	ZnO
Fecal consistency ¹ at 24h after challenge with E. coli K88	2.7 ^a	2.0 ^b	1.9 ^b
% pigs that excreted E. coli K88 7d after challenge	81 ^a	29 ^b	42 ^{ab}
Mortality, %	40.0 ^a	6.6 ^b	13.3 ^b

¹Fecal consistency: 0, normal; 1, soft stools; 2, mild diarrhea media; 3, severe diarrhea

a vs b, P<0.05

E. COLI K88 INFECTED PIGS FED DIETS WITH PLASMA PERFORM SIMILAR TO MEDICATED DIETS

Pigs were infected with E. Coli K88 on day 4 after weaning. Pigs were fed diets (+ or -) 6% SDP and (+ or -) antimicrobials (A) providing 250 mg/kg Colistin and 500 mg/kg Amoxycycline in the diet. Pigs fed a diet with SDP grew better than pigs fed the diet without A. Pigs fed the diet with SDP and A had the best ADG. The effects of SDP plus A on growth were additive.



SDP+ vs. SDP-, P<0.05

RESEARCH BRIEF

BOTTOM LINE

SWINE



DIARRHEA (SCOURS)



MORTALITY



GROWTH



PRODUCT OPTIONS

AP 920 | 820 spray dried plasma powder or Appetein granulated plasma are both options for use in swine experiencing stress from *E. coli* and may be formulated into a special diet or used as a top dress.

Solutein is a multi-purpose water soluble and (top dress) feed additive management tool. It contains plasma and serum proteins as well as other vital nutrients for swine health and nutrition. Please ask for the Solutein brochure for details on mixing and feeding rates.



AP 920 | 820
Spray Dried Plasma Powder



APPETEIN
Granulated Plasma



SOLUTEIN
Soluble Protein Blend

MULTIPLE STUDIES DEMONSTRATE THAT ADDING SPRAY DRIED PLASMA (SDP) TO PIG DIETS **LEADS TO INCREASED GROWTH PERFORMANCE, REDUCED INFLAMMATION, REDUCED DIARRHEA AND IMPROVED AVERAGE DAILY GAIN AND SURVIVAL.**



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- Torrallardona et al., 2007, Livest Sci. Evaluation of spray-dried animal plasma and calcium formate as alternatives to colistin in piglets experimentally infected with *Escherichia coli* K99;
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- Van Dijk et al., 2002, Vet Microbiol, The effect of dietary spray-dried porcine plasma on clinical response in weaned piglets challenged with a pathogenic *Escherichia coli*;
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- Luppi, A., 2017, National Library of Medicine Swine enteric colibacillosis: diagnosis, therapy and antimicrobial resistance;
- Colibacillosis (*E. coli* diarrhea). Iowa State University. (n.d.). <https://vetmed.iastate.edu/vdpam/FSVD/swine/index-diseases/Ecoli-diarrhea>;
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