

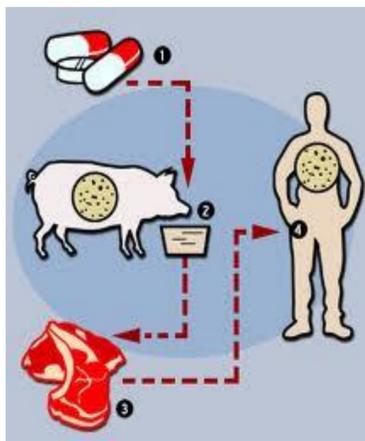
# Plasma Proteins are a Natural Alternative to Antibiotics in Feed for Weanling Pigs

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## Introduction

Weaning is characterized by a period of anorexia that leads to gut barrier dysfunction associated with intestinal inflammation, increased intestinal permeability and as a result increased sensitivity to enteric infections and diarrhea. Traditionally, sub-therapeutic antibiotics (ATB) were included in feed as antimicrobial growth promoters (AGP) to reduce the harmful effects of enteric pathogenic bacteria. However, AGP were banned in the EU in 2006 due to the concern that their use in feed may contribute to the development of microbial resistance to ATB used in both animal and human medicine. But, contrary to EU regulatory intentions, the use of prescription diets with therapeutic levels of ATB has increased since the ban, resulting in greater risk for development of antimicrobial resistant bacteria. Therefore, alternatives to the use of sub-therapeutic antibiotics are increasingly important for all phases of food animal nutrition.



## Spray Dried Plasma as Alternative to Antibiotics

Significant research has demonstrated the benefits of using spray-dried plasma (SDP) as an alternative to ATB in feed for weanling pigs (Bikker et al., 2004; Bosi et al., 2004; Torrallardona et al., 2002, 2003, 2007, 2010; Lallès et al., 2009).

## Mode of Action of SDP

The mechanisms by which SDP benefits animal well being are not fully understood but past research has suggested the naturally occurring antibodies in SDP offer protection against pathogens. In addition, recent research indicates that dietary SDP supported and maintained gut barrier function during intestinal inflammation induced by intraperitoneal injection of an antigen, *Staphylococcus aureus* enterotoxin B, which by-passed the potential for an antigen-antibody interaction in the gut lumen (Moretó and Pérez-Bosque, 2009; Pérez-Bosque et al., 2010).

**Table 1.** Summary of different peer review studies using spray-dried plasma (SDP) as alternative to antibiotics (ATB)

Antibiotic	Challenge	SDP level	Results Plasma vs control	Results SDP vs ATB	Reference
Colistin	-	5%	↑ ADG; ↓ F:G	No diff.	Torrallardona et al., 2002
Colistin	<i>E. coli</i> K99	7%	↑ ADG; ↑ ADFI; ↓ F:G; ↑ Small intestine weight; ↑ Villi height; ↑ <i>Lactobacilli</i> in ileal and cecal digesta	No diff.	Torrallardona et al., 2003
Colistin + Amoxicycline	<i>E. coli</i> K88	6%	↑ ADG; ↑ ADFI; ↓ Plasma and salivary K88 specific IgA antibody titers; ↓ Ulcerations; ↓ Edema; ↓ ICI*; ↑ Crypt depth; ↓ IL-8; ↓ TNF-α; ↓ IFN-γ	No diff.	Bosi et al., 2004
Colistin	<i>E. coli</i> K 99	6%	↑ ADG ; ↑ ADFI	No diff.	Torrallardona et al., 2007

ADG: Average Daily Gain; ADFI: Average Daily Feed Intake; F:G : Feed Conversion or Feed:Gain; No diff. : No differences observed between the SDP treatment compare with the ATB treatment

These authors concluded that the preventative effect of SDP on intestinal inflammation involved modulation of intestinal cytokines that was characterized by expression of anti-inflammatory cytokine.

Further research (Maijó et al., 2012) has demonstrated that dietary SDP impacts a similar modulation of pulmonary cytokines that were again shown to have increased expression of anti-inflammatory cytokine. These results suggest that dietary SDP impacts the common mucosal systems, not just the local mucosal system in the gut.

## Conclusion

Recent publications (Lallès et al., 2009; Torrallardona et al., 2010) suggested that diets supplemented with SDP is probably one of the best ways to prevent post-weaning gut disorders and that SDP can be safely used as an alternative to ATB without risk of generating antibiotic resistance bacteria.

## References

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