

**White Paper:
Review Article on the Mode of Action of Spray-Dried Plasma for Poultry entitled:
Impact of Spray-Dried Plasma on Intestinal Health and Broiler Performance**

by: Joy M. Campbell, Joe D. Crenshaw, Ricardo González-Esquerra and Javier Polo

The review provides information for the poultry industry's need for nutritional strategies that support the immune system, promote intestinal integrity and functionality, and increase tolerance to stress and disease challenges. This further supports the industry due to the accelerating trend of reducing the dependence on the use of antibiotics in poultry production.

Despite the vast amount of research published on the use of spray-dried plasma (SDP), and its extensive use in pig and ruminant nutrition, the use of this functional ingredient has not been frequently utilized by the poultry industry. Campbell et al., 2019 reviewed the current understanding on the modes of action of SDP in animals discussing it in the context of the published literature available in poultry. In this sense, the feeding of SDP has been associated with an increased efficiency in the immune response as suggested by various trials conducted in rats, mice, and pigs. In these animals, induced inflammation either by stress or pathogen challenge was significantly reduced by SDP supplementation regardless of whether the primary sites affected were the gastrointestinal, respiratory or the reproductive tracts. The data available suggests that SDP supports immune efficiency which, from a nutritional point of view, is a high energy response; thus, using SDP directs more nutrients to growth and productivity.

The capacity of plasma to reduce gut permeability, improve nutrient uptake and structural integrity when leaky gut is induced, was discussed in the paper. These responses were likely mediated by a reduction in the expression of pro-inflammatory cytokines, and by an elevation in the expression of anti-inflammatory cytokines, along with an increased expression of defensins. Data showing a reduction in lymphocyte activation and infiltration, lessening of edema, and changes in the gut microbiota, were also presented.

Altogether, these changes suggested an immune modulation effect of SDP and an increased restoration of mucosal homeostasis. Campbell et al., 2019 showed that similar effects have been reported in other mucosal systems like the respiratory and reproductive, indicating that the effects of feeding SDP are not limited to the gastrointestinal tract.

The review did not explore the benefits related to its proteins high nutritional value and its high amino acid digestibility focusing primarily on its effects related to the immune response.

Data reviewed on poultry indicated that feeding SDP to poultry improved overall health, stress tolerance and economically important parameters such as gain, feed efficiency and livability, likely through mechanisms related to the ones mentioned before.

The authors mentioned performance and livability benefits reported in birds fed SDP and subjected to disease challenges such as necrotic enteritis, Salmonellosis, *E. coli* and *Streptococcus* in broilers, and *Pasteurella multocida* in turkeys. Likewise, broilers under high stocking density, environmental stress, and field conditions, benefited by SDP supplementation. Performance benefits were also reported in broilers fed antibiotic growth promoters showing an additive SDP effect. In several trials reviewed by Campbell, et al. 2019, the reductions in mortality after feeding SDP were highly significant. For example, in a natural necrotic enteritis outbreak, control broilers showed 44% vs 10% mortality in SDP-fed chickens. In a broiler trial conducted in pens within a commercial barn whereby an inadvertently high mortality was observed, and *E coli* and *Streptococcus* were isolated, the control group had 83.9% vs a gradual reduction in mortality when fed increasing levels of SDP during the starter period only, down to 14.1% for the group fed 6g of SDP per bird, the highest SDP level tested. In agreement with this report, the data reviewed by the authors showed significant benefits when SDP was only added to the starter diet.

Overall, Campbell et al., 2019 introduced the use of SDP in the feed as a viable nutritional strategy to increase the tolerance of poultry to unspecific stressors and disease challenges, to improve performance and to reduce mortality due to SDP's immune modulatory effect.