

Field Evaluation of Feeding Spray Dried Plasma in the Starter Period on Final Performance and Overall Health of Broilers

Feeding SDP in the first 10 days of life can provide longer-term benefits to commercial broiler performance and health under a wide variety of circumstances

Introduction: Spray dried plasma (SDP) has previously been shown to improve growth, feed efficiency and health when provided in starter diets for broilers (Campbell et al. 2003, 2006; Henn et al., 2013). The effect of feeding SDP during the starter period was recently evaluated on performance and overall health of broilers at an integrated production system in the State of São Paulo, Brazil (Belote et al., 2021).

The I See Inside (ISI) methodology assessing gut health in broilers was used as a tool to evaluate the impact of dietary SDP under commercial conditions. It was hypothesized that adding SDP in starter broilers diets could improve overall performance at the processing age in commercial broilers, and that the ISI methodology could be a management tool in the field to assess the impact of SDP on gut health.

One hundred farms within the integrated production system representing approximately 1.1 million broilers were used in the study and each farm was considered an experimental unit. Two groups of farms were fed either a control or SDP diet containing 1% SDP (AP 920, APC Brazil, São Paulo, Brazil), from 0 to 10 d of age. Diets were formulated to have similar nutrient density and the only difference was the addition or not of SDP replacing soybean meal in the starter diet. After 10 d, both groups were fed common commercial diets. All diets per phase were formulated to meet or exceed the nutrient requirements for broilers (Cobb manual, 2018). The experiment followed a 2 × 2 factorial design (Table 1), considering starter diets with or without 1% SDP and 2 different house ventilation systems described as negative pressure (NP) and conventional positive pressure (PP).

Table 1 - Description of number of farms under type of ventilation system in different groups.

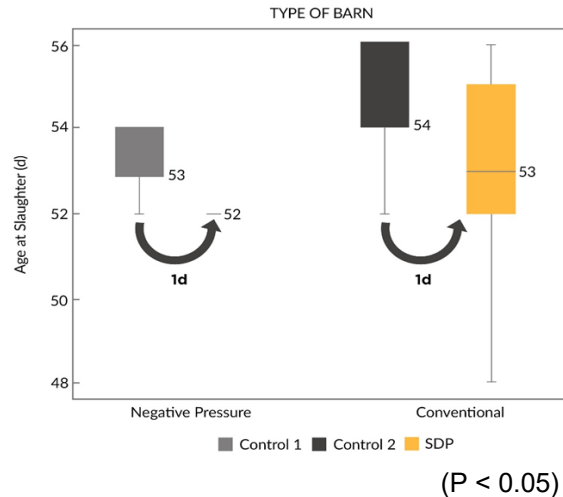
TYPE OF VENTILATION	SPRAY DRIED PLASMA IN THE FEED		TOTAL
	YES	NO	
Negative Pressure	4	13	17
Positive Pressure	50	33	83
Total	54	46	100

Broilers were sent to market as they reached 3.05 kg; therefore, the mean (M) and median (MD) age at slaughter (AS) was evaluated as a dependent variable along with other performance measures. From the 100 farms used in the trial, 35 farms (16 control and 19 SDP farms – 526,011 broilers in total) were selected for the assessment of broiler health, biosecurity, and local management. Six broilers per farm (210 broilers in total) at 14 ± 2 d of age were necropsied and ileum was sampled for the ISI methodology evaluation. Biosecurity and management were also evaluated to analyze their influence on animal health.

Results

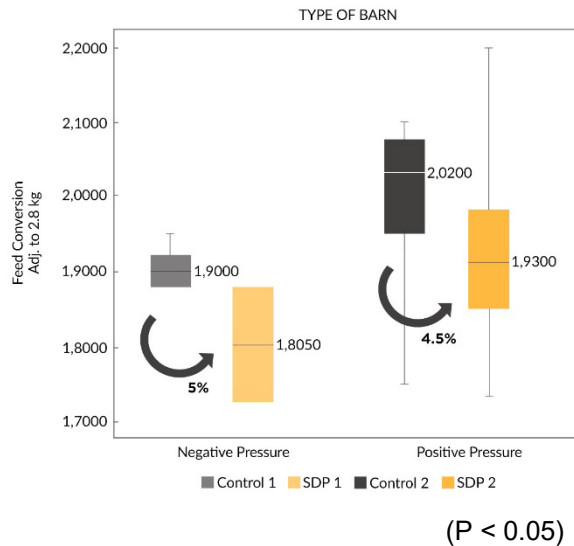
Independent of the ventilation system, feeding SDP reduced ($P < 0.05$) the median AS by 1 d compared to the control group of farms (Figure 1).

Figure 1. Median age at slaughter by type of barn fed control or SDP starter diet.



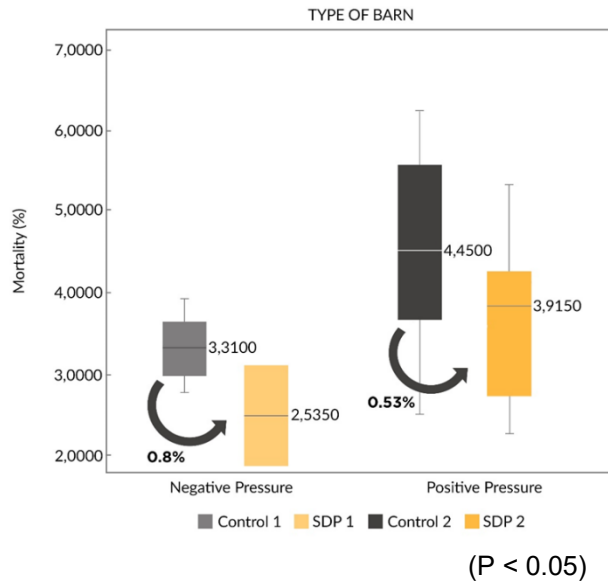
Feeding SDP in the starter diet yielded improvements ($P < 0.05$) in feed conversion ratio adjusted to 2.8 kg (FCRA) at the end of the production cycle in both NP and PP farms resulting in a reduction of 0.095 and 0.09 points (median) in FCRA (Figure 2).

Figure - 2. Median feed conversion rate adjusted to 2.8 kg body weight by type of barn fed control or SDP starter diet.



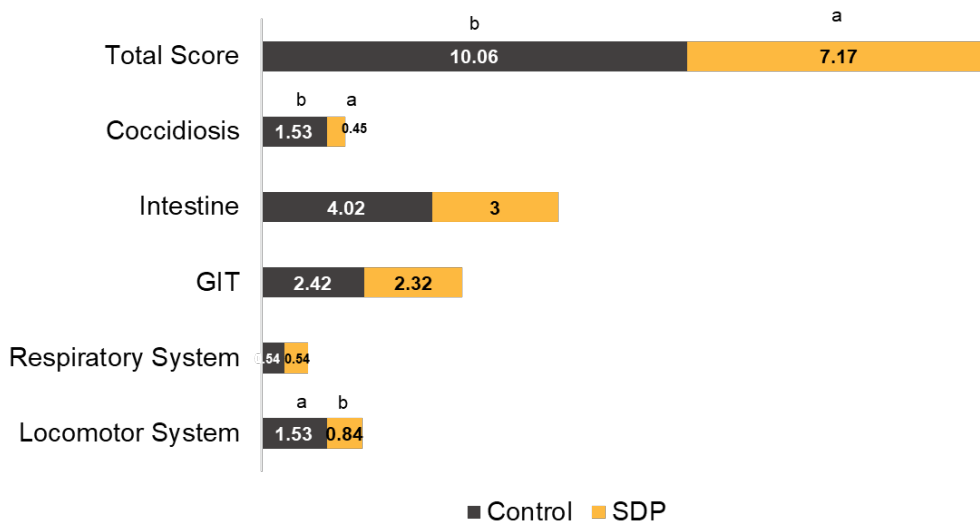
Also, a reduction of 0.8 and 0.5% in overall (median) mortality was observed when broilers were fed SDP in the starter diet and raised in NP and PP farms, respectively, when compared to the controls (Figure 3).

Figure - 3. Median mortality in negative pressure and positive pressure farms fed control or SDP starter diets.



Results of the ISI microscopic evaluation indicated that broilers fed SDP had 45% less alterations in the locomotor systems, 70% less coccidiosis-associated lesions in the gut, and a 28% reduction in the ISI total score (Figure 4).

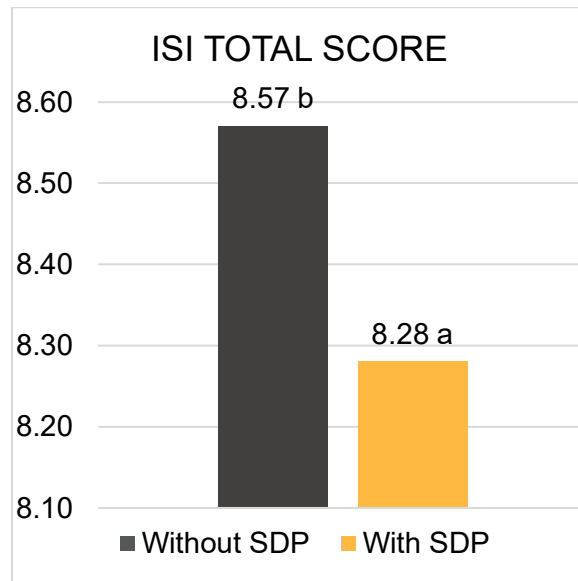
Figure - 4. Parameters of the ISI methodology of ileum evaluation between control and SDP-fed broilers.



Different letters (a, b) indicate a significant difference ($P < 0.01$). Abbreviations: ISI, I See Inside; SDP, spray-dried plasma.

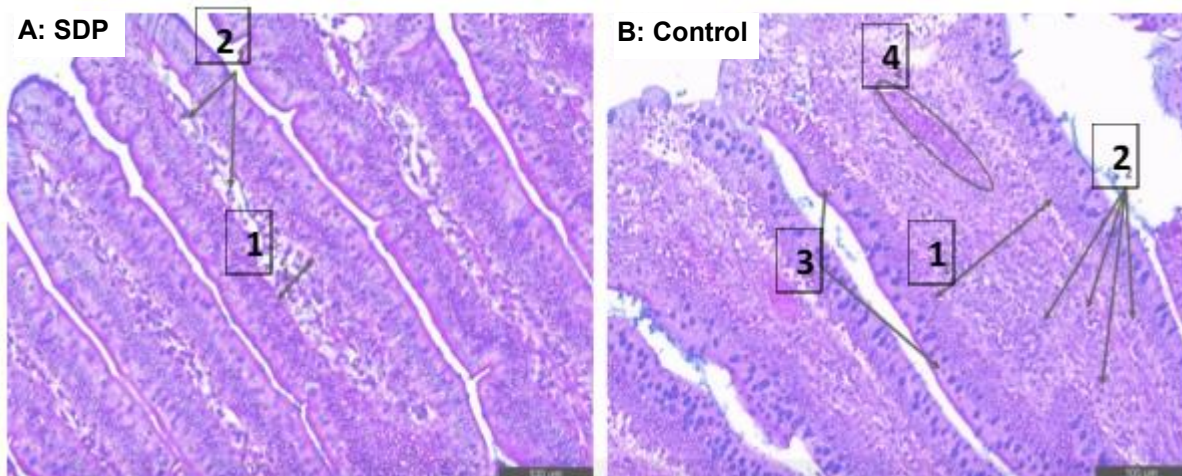
Ileal histologic evaluation showed less pathological alterations in broilers fed SDP compared to the control starter diet. Broilers fed SDP compared to the controls had lower scores of laminae propria thickness, inflammatory cell infiltration in the epithelium and lamina propria, and congestion ($P < 0.05$). Collectively, the reduced scores for these parameters in SDP-fed broilers resulted in a lower ISI total score, even though the SDP-fed broilers had an increased score for goblet cell proliferation (Figure 5 and 6).

Figure 5. ISI total score of ileum evaluation between control and SDP-fed broilers.



Different letters (a, b) indicate a significant difference ($P < 0.01$). Abbreviations: ISI, I See Inside; SDP, spray-dried plasma.

Figure – 6. Photomicrography of ileum sections of broilers fed SDP (A) or Control (B) diets



(A) 1, Low ISI score of laminae propria thickness; 2, low ISI score of inflammatory cells infiltration in the lamina propria in the farms fed with SDP (A, 200×). (B) 1, High ISI score of laminae propria thickness; 2, high ISI score of inflammatory cells infiltration in the lamina propria; 3, inflammatory cells infiltration in the epithelium; 4, high ISI score of congestion in broilers of the control group (B, 200×). Abbreviations: ISI, I See Inside; SDP, spray-dried plasma.

Conclusion: Feeding 1% SDP in the starter diet reduced overall mortality and improved growth and adjusted feed conversion at a similar rate in commercial broilers housed in either NP or PP barns. Feeding SDP to broilers resulted in better overall health with reduced coccidia lesions and other pathologic alterations in the small intestine and cecum, and less pathologic alterations in the locomotor system. Collectively, these observations suggest that feeding SDP in the first 10 days of life can provide longer-term benefits to commercial broiler performance and health under a wide variety of circumstances. Additionally, there was good agreement between necropsy and histologic ISI scores obtained in commercial broilers and their final performance. Both hypotheses originally established for the trial were confirmed.

References:

Belote et al. 2021. Field evaluation of feeding spray-dried plasma in the starter period on final performance and overall health of broilers. 2021 Poultry Science 100:101080.

Campbell et al. 2003. Effect of spray-dried bovine serum on intake, health, and growth of broilers housed in different environments. J. Anim. Sci. 81:2776–2782.

Campbell et al. 2006. Effect of spray-dried plasma form and duration of feeding on broiler performance during natural necrotic enteritis exposure. J. Appl. Poult. Res. 15:584–591.

Henn et al. 2013. Inclusion of porcine spray-dried plasma in broiler diets. J. Appl. Poult. Res. 22:229–237.

To access the complete article, click:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8044691/>