

Evaluating Different Nutritional Approaches Under Therapeutic Zinc Oxide (ZnO) Restrictions

Rangel, L.¹, Shen, Y.¹, Borges, L.¹, Polo, J.¹, Crenshaw, J.¹,
¹APC, LLC, Ankeny, IA. USA,

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Post-weaning diarrhea (PWD) remains a major challenge in pig production, particularly in regions where therapeutic levels of zinc oxide (ZnO) have been banned. As a result, alternative nutritional strategies that support piglet health and growth while mitigating post weaning diarrhea (PWD) are urgently needed.

This document discusses three independent publications evaluating the effectiveness of different nutritional approaches as alternatives to therapeutic ZnO, including spray-dried plasma (SDP) in post-weaning phase 1 and/or phase 2 diets with Low or Normal levels of crude protein (CP) and amino acids (AA).

In the first publication [1], pigs were fed Low CP/AA diets during Trial 1. SDP supplementation in Phase 1 or both Phases 1 and 2 improved average daily gain (ADG) and feed intake during the initial post-weaning period with sustained benefits observed throughout the nursery. Additionally, there was a numerical reduction in mortality and medication use when SDP was included in Phase 2 compared to its inclusion only in Phase 1 or to the control diet (Table 1). In Trial 2 Normal CP/AA diets formulated to meet CP and AA requirements were used. SDP inclusion in Phase 2 led to significant increases in ADG and final body weight (BW) at the end of the nursery compared to SDP supplementation only in Phase 1 or to the control group. Comparing Trials 1 and 2, SDP inclusion in Phase 2 diets had a greater impact on ADG and BW when using Normal CP/AA diets. Figure 1 presents body weights from both trials.

Another publication [2] reports the results of Trial 3, which tested Low CP/AA levels in Phase 1 diets without or with 6% SDP followed by Low versus Normal CP/AA levels in Phase 2 diets without or with 2.5% SDP. Normal CP/AA phase 2 diets with SDP inclusion in both Phases 1 and 2 resulted in a 2.34 kg increase in final body weight compared to the Low CP/AA phase 1 and 2 diets without SDP. These findings indicate that a Low CP/AA strategy in Phase 1 supplemented with SDP followed by a Normal CP/AA strategy in Phase 2 supplemented with SDP resulted in the best overall ADG and final BW (Figure 2). Furthermore, pigs fed diets with SDP or diets with Low CP/AA had reduced diarrhea and intestinal inflammation.

Table 2 presents the nutritional levels used in phase 1 diets of the above Trials 1-3, comparing them with Danish standards [3] without therapeutic ZnO and Brazilian standards [4] with therapeutic ZnO. It also includes SDP and soybean meal inclusion levels and ADG data for Phase 1 diets. Additionally, Table 3 provides a similar comparison for Phase 2 nursery diets. The soybean meal inclusion levels represent practical values commonly used in these two markets. It is evident that SDP in phase 2 diets is beneficial in the absence of therapeutic ZnO, especially when using normal protein levels in phase 2 diets. However, Brazilian performance results with therapeutic ZnO were superior compared to the non-therapeutic ZnO treatments in other groups.

Conclusion

In summary, including SDP in Phase 2 diets is an effective nutritional strategy to enhance growth performance in post-weaning pigs. Additionally, the inclusion of SDP as a highly digestible, functional ingredient allows pig producers to increase protein and amino acid levels in post-weaning diets without worsening PWD, providing a practical solution in regions where therapeutic ZnO use is restricted.

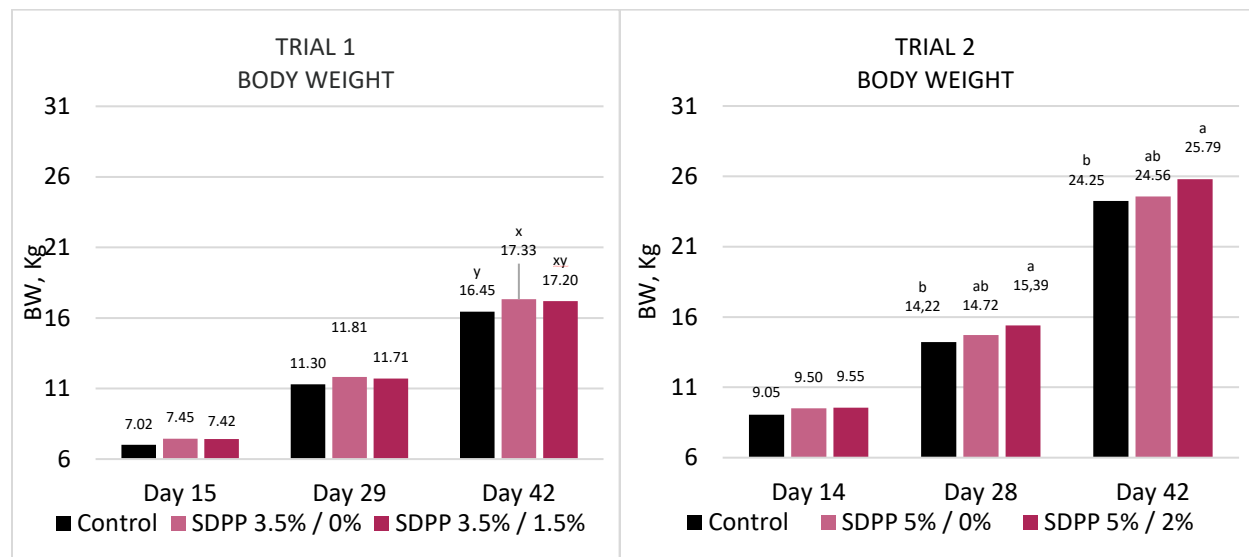


Figure 1 – Body weights of Trial 1 and Trial 2 at 42 d after weaning.

Table 1 – Health changes in pigs when plasma was added to phase 2 diets without medical levels of ZnO in the nursery phase – Trial 1.

	CONTROL	SDPP 3.5% / 0%	SDPP 3.5% / 1.5%
Mortality, %	2.06	2.65	1.04
Culling, %	3.44	4.17	3.13
Mort + Culling, %	5.50	6.82	4.17
Overall Medication, %	21.17	19.29	16.41

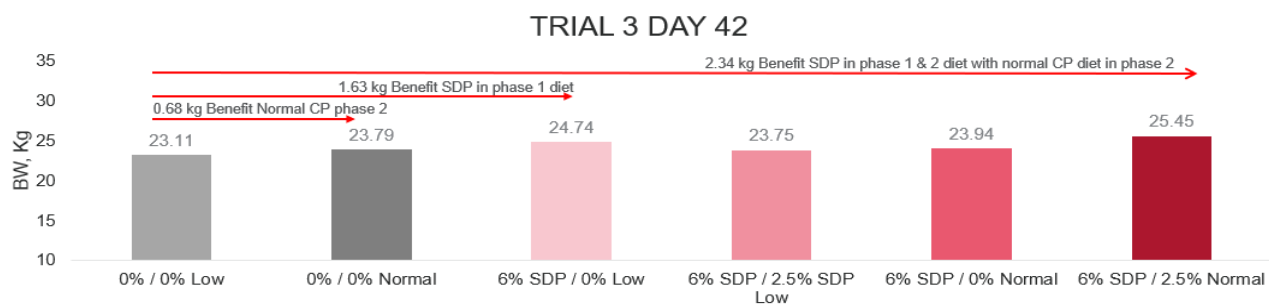


Figure 2 – Body weights of trial 3 at 42 d after weaning.

Table 2 – Nutritional levels and ADG comparisons of phase 1 diets.

Phase 1	CP %	Dig Lys %	Dig Thr %	Dig Met %	ME, kcal/kg	Soybean Meal, %	SDP %	Phase 1 ADG, g
Trial 1 - Low	16.00	1.120	0.780	0.380	3300	0	3.5	135
Trial 2 - Normal	20.50	1.280	0.831	0.410	3300	22.24	5	158
Trial 3 - Low	18.10	1.197	0.714	0.331	3341	13.00	6	163
Danish [3]	18.70	1.430	0.880	0.460	3858	2.00	5.0	188
Brazilian [4]	22.94	1.446	0.984	0.480	3450	10.0	5.0	324

Table 3 – Nutritional levels and ADG comparison of phase 2 diets.

Phase 2	CP, %	Dig Lys, %	Dig Thr, %	Dig Met %	ME, kcal/kg	Soybean Meal, Max %	SDP %	Phase 2, ADG, g	Total Nursery ADG, g
Trial 1, Low	17.10	1.150	0.760	0.400	3264	2.00	1.5	293	278
Trial 2, Normal	20.00	1.250	0.810	0.444	3280	25.50	2.0	417	439
Trial 3, Low	17.77	1.107	0.655	0.294	3353	22.00	2.5	460	426
Trial 3, Normal	19.50	1.386	0.714	0.350	3353	25.00	2.5	572	466
Danish [3]	19.50	1.300	0.800	0.420	3586	7.00	3.0	450	500
Brazilian [4]	21.20	1.336	0.909	0.441	3400	17.00	3.0	524	550

References:

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4. Rostagno et al. 2024. Brazilian Tables to Poultry and Swine. 5th Edition. March 2024.