Dietary Spray Dried Plasma on Immune Responses of Lactating Sows and Their Litters

PSIV-19

B. Kim[1], J. Kim[1], K. Kim[2], S. Kim[1], J. J. Lee[1], J. Kang[1], D. Mun[1], J. Baek[1], S. Kim[1], P. Ji[3], J. Choe[1], and M. Song[1]

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Click headings to further view content

Abstract

This study was conducted to investigate the effects of spray dried plasma (**SDP**) in lactation diets on immune responses of lactating sows and their litters. A total of 12 lactating sows (227.75 ± 7.50 kg BW; parity = 2.0 ± 0.7) were randomly assigned to 2 dietary treatments in a completely randomized design. The dietary treatments were a typical lactation diet based on corn and soybean meal (**CON**) and CON supplemented with 1% of SDP (**SDP**). Sows were fed experimental diets from d 30 before expected farrowing to weaning. Blood Samples were collected from sows on d 0, 3, and 7 after farrowing and randomly selected 2 piglets in each sow on d 3 and 7 after birth. Measurements were serum tumor necrosis factor-α (**TNF-α**), transforming growth factor-β (**TGF-β**), C-reactive protein (**CRP**), cortisol, and immunoglobulin (**Ig**)G, M, and A from their litters by the enzyme-linked immunosorbent assay. Data were analyzed using the PROC GLM of SAS. Sows fed SDP tended ($P < 0.10$) to have lower serum TNF-α on d 3 (264.94 vs. 281.96 pg/ml) and d 7 (249.35 vs. 272.15 pg/ml) than sows fed CON. Moreover, SDP tended ($P < 0.10$) to decrease of serum TGF-β (311.37 vs. 448.07 pg/ml) and cortisol (0.47 vs. 0.55 ng/ml) on d 3 compared with CON. The litters from sows fed SDP tended ($P < 0.10$) to reduce serum TNF-α (349.87 vs. 423.57 pg/ml), TGF-β (853.49 vs. 980.41 pg/ml), and cortisol (0.62 vs. 1.05 ng/ml) on d 7 than litters from sows fed CON. However, there were no differences on CRP, IgG, IgM, and IgA of sows and their offspring between CON and SDP. In conclusion, supplementation of dietary spray dried plasma in lactation diets may reduce inflammatory responses of sows and their litters.

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Introduction

❖ Spray dried plasma (SDP)
- ➢ Mixture (albumin, glycoprotein, growth factor, immunoglobulin, etc.)
- ➢ Commonly used in early nursery diets
  - ✓ Not in sow diets

❖ Immunological benefits on weaned pigs
- ➢ Decrease of pro-inflammatory cytokines
- ➢ Enhancement of intestinal barrier integrity

❖ Positive effects on sow
- ➢ Increase of feed intake
- ➢ Increase of litter body weight

❖ Little information for dietary SDP on immune responses of sows and their litters

Objective

❖ To investigate the effects of spray dried plasma on immune responses of lactating sows and their litters

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PSIV-19

Abstract
Introduction
Materials & Methods
Results Ⅰ
Results Ⅱ
Conclusion

Click headings to further view content

Materials & Methods

❖ Experimental design: completely randomized design

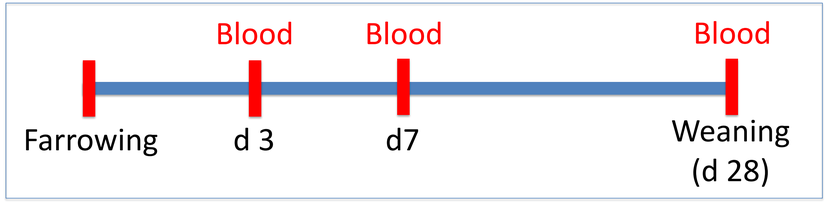
❖ Animals: 12 sows
- ➢ BW: 227 ± 1.64 kg BW; 2.0 parity; 6 replicates

❖ Dietary treatments
1) Typical diet based on corn and soybean meal (CON)
2) CON + 1% of SDP

Item	Gestation		Lactation	
	CON	SDP	CON	SDP
Ingredients, %				
Corn	75.82	76.72	65.54	66.53
SBM, 45%	21.30	19.40	31.81	29.82
SDP	-	1.00	-	1.00
Others[1]	2.88	2.88	2.65	2.65
Calculated composition				
ME, Mcal/kg	3.32	3.32	3.43	3.43
CP, %	15.86	15.82	19.76	19.72

[1]Others: limestone, MDCP, vit-min premix

❖ Feeding period: d 30 before farrowing to weaning (d 28)



❖ Blood collection
- ➢ 6 sows per dietary treatment
- ➢ Randomly selected 2 piglets from each sow per dietary treatment

❖ Measurements
- ➢ Serum tumor necrosis factor-α (**TNF-α**), transforming growth factor-β (**TGF-β**), C-reactive protein (**CRP**), cortisol, and immunoglobulin (**Ig**)G, M, and A from sows and their litters

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PSIV-19

Abstract

Introduction

Materials & Methods

Results Ⅰ

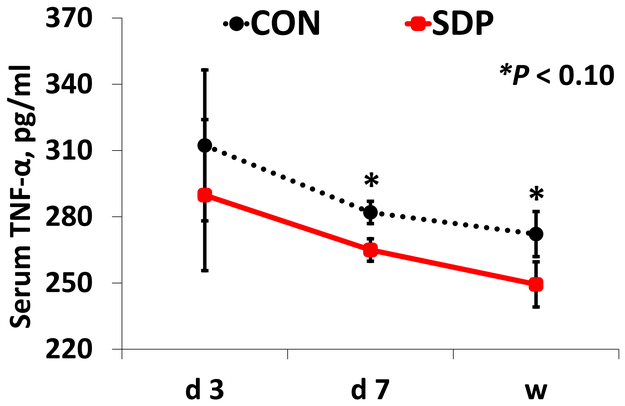
Results Ⅱ

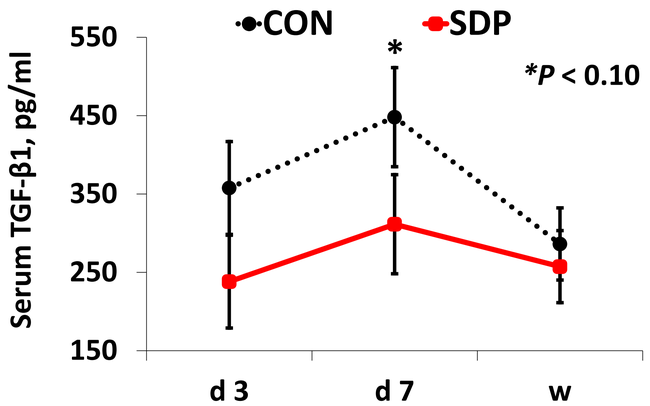
Conclusion

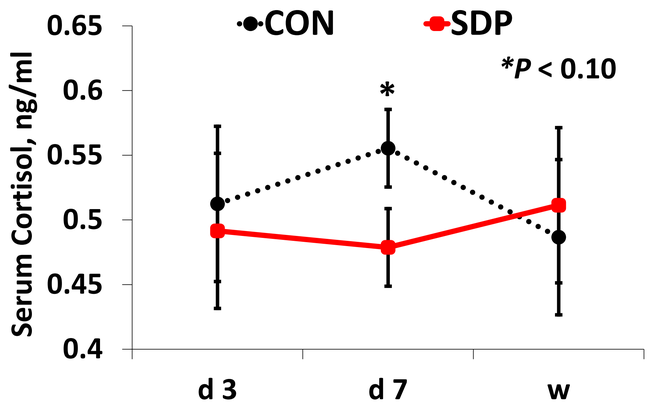
Click headings to further view content

Results Ⅰ

❖ Sows







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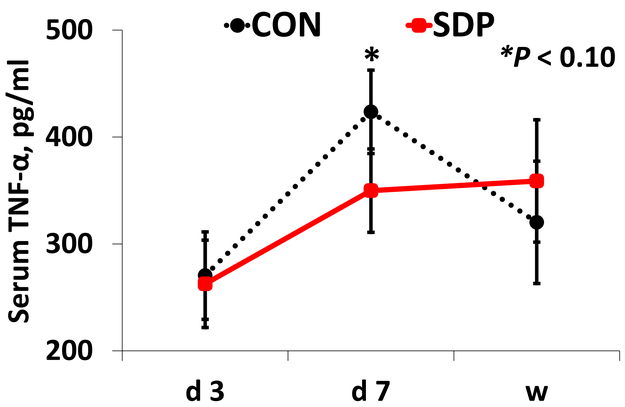

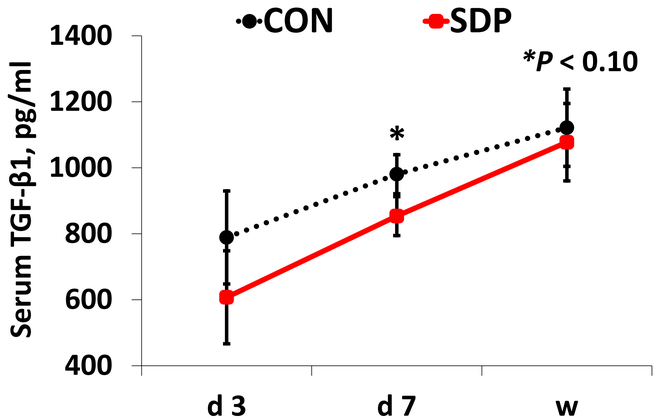

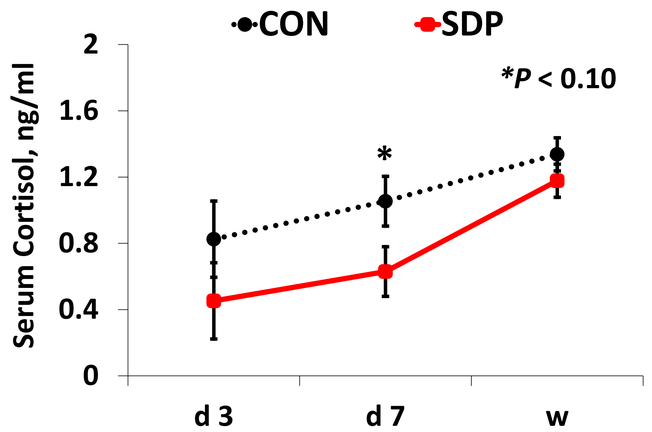

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PSIV-19

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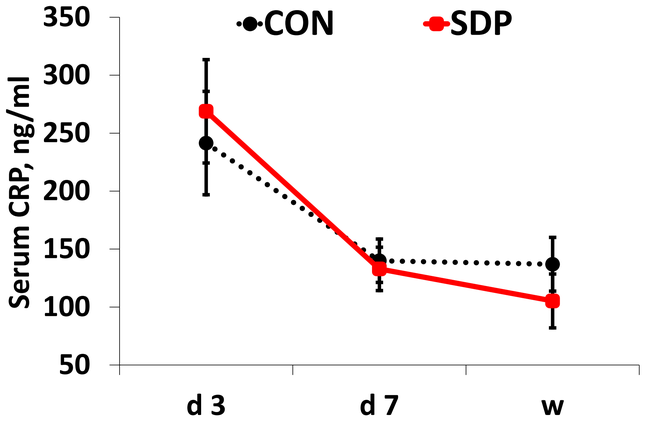
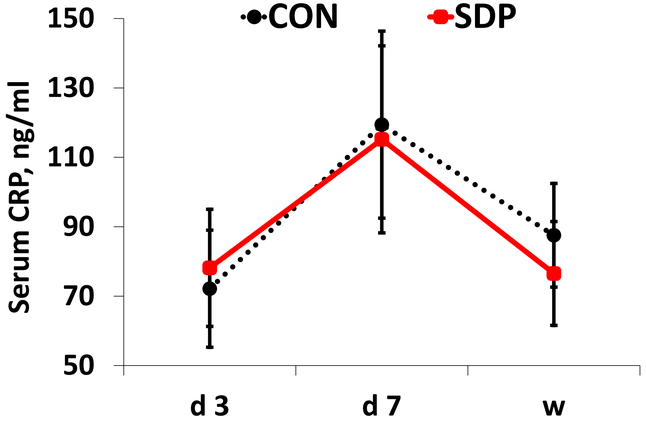
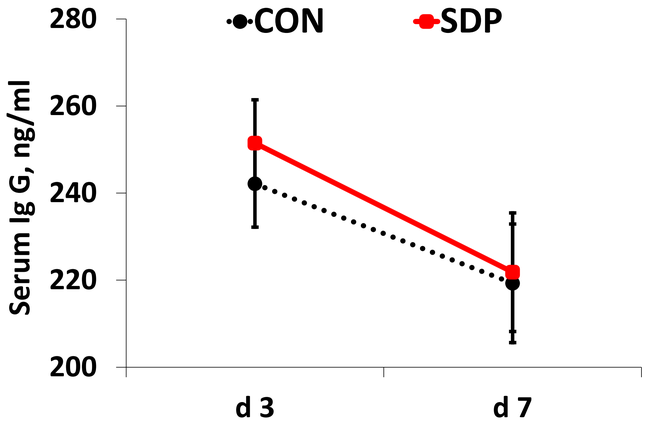
Results Ⅱ

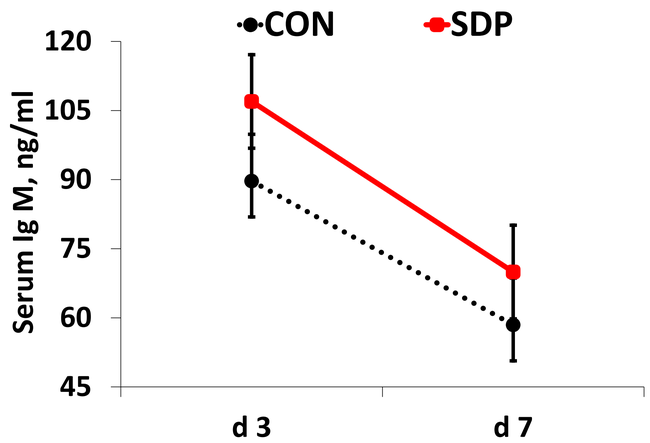
❖ Sows

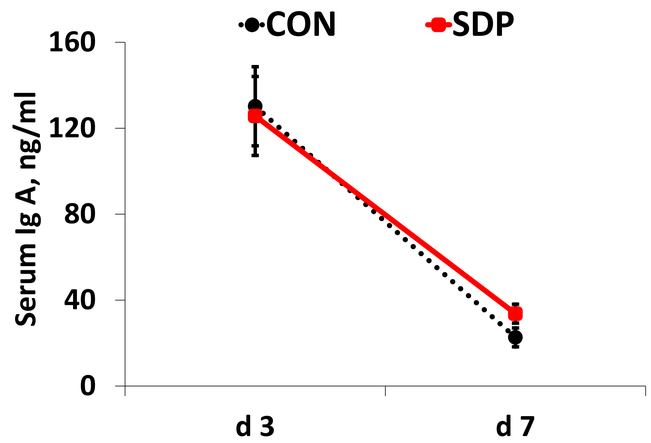


❖ Litters









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Abstract

Introduction

Materials & Methods

Results Ⅰ

Results Ⅱ

Conclusion

Click headings to further view content

Conclusions

❖ Dietary supplementation of spray dried plasma in lactation diets may reduce inflammatory response of sows and their litters.

❖ Please see an another companion abstract (PSVI-24: Growth performance and immune responses of weaned pigs from lactating sows fed dietary spray dried plasma).

References

❖ Crenshaw, J. D., R. D. Boyd, J. M. Campbell, L. E. Russell, R. L. Moser, and M. E. Wilson. 2007. Lactation feed disappearance and weaning to estrus interval for sows fed spray-dried plasma. J. Anim. Sci. 85:3442–3453.

❖ Moretó, M., and A. Pérez-Bosque. 2009. Dietary plasma proteins, the intestinal immune system, and the barrier function of the intestinal mucosa. J. Anim. Sci. 87:E92–E100.

Acknowledgement

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