Research Notes

Arm & Hammer Animal and Food Production

CERTILLUS Fed to Sows Influences Immune Development in Their Offspring

CERTILLUS™ Targeted Microbial Solutions™ use proprietary strains of *Bacillus* selected to combat specific pathogenic challenges.

STUDY OVERVIEW

- This study[1,2] was conducted on a commercial swine facility in Minnesota and included 500 sows to evaluate the immune effects of CERTILLUS fed during gestation and lactation, as well as 1100 pigs weaned from these sows to determine any carryover response to sow treatment in the nursery period.
- Diets were fed from three weeks after breeding through gestation and lactation. CERTILLUS was dosed at 3.75×10^5 CFU/g feed.
- Blood samples were obtained from sows prior to farrowing, their piglets at weaning, and at three weeks post-weaning to measure serum tumor necrosis factor-α (TNFα) and α-1-acid glycoprotein (α-1-AGP).
    - TNFα is an inflammatory cytokine involved in the acute phase response.
    - α-1-AGP is an acute phase protein associated with environmental, social and disease stressors and is negatively correlated to pig growth performance and efficiency.

RESULTS

- Pigs weaned from sows fed CERTILLUS had greater ($P<0.05$) blood serum TNFα concentrations at weaning compared to pigs from sows fed the control diet.
- Blood serum levels of α-1-AGP tended to be lower ($P<0.10$) in pigs weaned from sows fed CERTILLUS at weaning and three weeks post-weaning compared to pigs from sows fed the control diet.

TABLE 1. TNFα AND α-1-AGP CONCENTRATIONS IN BLOOD SERUMS

	CONTROL	CERTILLUS	SE	*P*=
TNFα, pg/mL				
Weaning	3.59	7.15	1.96	0.02
3 weeks post-wean	2.24	4.51	1.77	0.25
α-1-AGP, ug/mL				
Weaning	8750	6914	905	0.08
3 weeks post-wean	2751	1924	529	0.09

CONCLUSIONS

- CERTILLUS administered to sows during gestation and lactation modulated immune development in their offspring as evidenced by greater levels of the inflammatory cytokine, TNFα, and lower levels of the acute phase protein, α-1-AGP, during the nursery period.
- Increased levels of inflammatory cytokines are typically associated with disease challenge and are associated with reduced productivity. In this case, pigs with greater levels of serum TNFα had the best performance in the nursery, so the elevated TNFα concentrations at weaning likely signify enhanced immune development maturation in pigs weaned from sows fed CERTILLUS.
- Elevated concentrations of α-1-AGP are associated with reduced growth performance in pigs. The improved BW gain and efficiency observed in pigs weaned from sows fed CERTILLUS aligns with the lower α-1-AGP concentrations in the nursery period.

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1 Sinn S, Beckler D. Evaluation of feeding Envosure with and without DFM on sow and litter performance. 2016. NutriQuest Modeling Center.
2 Sinn S, Beckler D. Evaluation of feeding Evosure, DFM, and their combination to sows during gestation and lactation on growth performance of their offspring during the post-weaning phases. 2016. NutriQuest Modeling Center.