Swine Innovation Porc

FUNCTIONAL AMINO ACIDS

Examination of the effectiveness of provision of functional amino acids to enhance pig robustness

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Why is this project important?

The post-weaning period represents a critical time for pig development, and there is increased awareness today about the relationship between management of pigs during the perinatal period (i.e., from late fetal development to several weeks post-weaning) and subsequent performance and well-being. The combination of environmental, nutritional, and social stressors experienced by pigs at this time contribute to the post-weaning growth lag often observed in newly-weaned pigs. This lag is characterized by reduced feed intake and growth rate.

To complicate the matter, pigs are continuously exposed to microbial pathogens that negatively impact animal productivity. Pigs exposed to immune challenge, without exhibiting any clinical signs of disease, show reduced appetite and growth and less efficient use of nutrients compared to healthy animals. This decrease in performance can have a substantial impact on producer profitability.

Fortunately, it has been suggested that feeding a low protein diet fortified with adequate amounts of amino acids will improve gut health and function in piglets. Clearly, a better understanding of the interaction of nutrition and the pig's immune response will be a key component in efforts to reduce feed costs and antibiotic use. At the same time, it will improve animal robustness and profitability of the swine industry.

What will researchers do?

- Functional amino acid supplementation and pig robustness: Researchers will test the hypothesis that provision of supplemental functional amino acids will improve immune status and gut health and, in the process, boost animal robustness in response to an enteric pathogen challenge.

- Piglet body weight and functional amino acid supplementation: Scientists will conduct experiments to explore the interaction among piglet body weight, diet composition, supplemental functional amino acids, and disease challenge/immune stimulation.
- Determine the impact of a nursery feeding program on subsequent growth performance, growth variation, and health status up to market weight.

What will be the benefit of this research?

Identifying dietary strategies for reducing the cost of nursery diets without compromising growth performance and gut health would be of great benefit to profitability. Previous research showed that feed costs during the nursery phase can be reduced by more than $2.00 per pig without compromising growth performance and carcass quality up to slaughter weight. While reducing nursery feed costs offers potential to reduce overall cost of production, feeding programs in the nursery must also maintain or improve performance. Previous work has indicated that poor performance in the post-weaning period is associated with poor overall wean-to-finish performance.

Producer profitability is an important focus in the pork value chain, as is the ability to maintain consumer demand for pork and pork products. Thus, developing and optimizing cost-effective post-weaning feeding strategies will enhance efficiency at the production level. As well, utilizing nutritional strategies to augment gut health and function in weaned pigs will eliminate the need for in-feed antibiotics.

What has been done so far?

As of 2021: Researchers found that supplementation with a mix of functional amino acids improved growth performance and attenuated the immune response in Salmonella-challenged nursery pigs. They also determined that a longer adaptation period further improves the effect of those functional amino acids.

Collaborators

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Project status

Currently in progress.
Results expected in 2023.

Additional resources and information about this project

R&D Featured Articles by Swine Innovation Porc

- Science Taking Bite out of Feed Costs
  August 13, 2020

Farmscape interviews

- Supplemental Amino Acids Increase Resistance to Infection
  April 17, 2020
- Scientists Evaluate Health Benefits of Functional Amino Acids
  March 24, 2020
- Optimum Nutrition and Reduced Stress at Weaning Maximises Lifetime Productivity
  February 26, 2019

Additional resources

- Clark, J. (2021, August 24). Improving post-weaning pig nutrition. *Farms.com*. https://www.farms.com/ag-industry-news/improving-post-weaning-pig-nutrition-794.aspx
- Rodrigues, L., Columbus, D. (2020, April) How to enhance pig robustness. *Better Pork.* pp 35-38. https://www.betterfarming.com/flippingbook/better-pork/2020/april/#35/z

Related subprojects

The work presented in this fact sheet is one of three subprojects that make up a larger, nation-wide and multi-institutional Swine Cluster 3 project titled: *Development of innovative strategies to reduce feed costs in the post-weaning period while maintaining optimal performance and health.* The three subprojects are as follows:

- Examination of the effectiveness of provision of functional amino acids to enhance pig robustness (*this fact sheet*)
- Strategies for detoxifying vomitoxin (DON) using innovative chemical and biological approaches in post-weaning piglets
- Pulse grains and organic acids to control growth performance and health of young pigs

Financial support for this project

This project is part of the Swine Cluster 3 (2018-2023) research program, made possible through financial support from Agriculture and Agri-Food Canada's Canadian Agricultural Partnership, eight provincial pork producer organizations and over 30 industry partners. Click here to learn more about the financial partners for Swine Cluster 3.