Swine Innovation Porc

MAXIMIZING PIGLET ROBUSTNESS AND PERFORMANCE

Innovative micronutrient strategies for maximizing piglet robustness and performance during the pre- and post-weaning periods

Jérôme Lapointe, AAFC Sherbrooke

Why is this project important?

Weaning puts tremendous stress on piglets, and the period following weaning involves a high incidence of intestinal disturbances, bacterial infections and energy deficiencies that lead to serious diseases. Unfortunately, these problems have been exacerbated by the selection for hyperprolific sows. This has resulted in more pronounced variations of within-litter birth weight of piglets and an increased number of vulnerable low birth weight piglets.

Given these challenges, it is vital to maximize micronutrient availability and antioxidant protection to ensure robustness of both newborn and newly weaned piglets. Also, in previous trials, it was shown that piglets may be deficient in vitamin A, vitamin D, and copper shortly after birth and thereafter during lactation.

The main objective of this project is to develop innovative nutritional strategies for pre- and post-weaned piglets. These approaches will optimize metabolic status and efficiency of copper, zinc, vitamin A and D, enhance health and robustness, improve environmental sustainability and maximize profits based on performance up to market weight.

What will be the benefit of this research?

This project aims to reduce feed costs and improve feed efficiency by enhancing robustness and performance of piglets through a more efficient use of micronutrients.

As well, all vitamins and trace minerals studied in this project, as well as antioxidant compounds, are of crucial importance to the health of pigs. Yet the availability of these substances has been problematic for newborn and weanling piglets. Therefore, the development of an innovative nutritional strategy for weaned piglets based on a more efficient utilization of these micronutrients will have an immediate impact on pig health and disease control.

What did researchers do?

- Evaluated the impact of including different levels of zinc in the diet of weanling piglets, and the effect of the dietary ratio between zinc and copper in those diets.
- Developed a specific nutritional approach to efficiently enhance and sustain the effectiveness of vitamin D and A in pig tissues throughout the pre- and post-weaning periods. This will be combined with the dietary administration of the optimal levels of zinc and copper in previously identified post-weaning diets.
- Evaluated the potential of the most efficient combination of copper, zinc, vitamin A and D, and the synergy between these micronutrients and a dietary antioxidant.

The first trial was undertaken to determine, for the first time, if the presence of high levels of zinc oxide in the post-weaning diet could be specifically associated with detrimental impacts on the effectiveness of copper, energy metabolism, oxidative stress, immune response and bacterial/metal resistance in piglets during the peri-weaning period (among others). The results obtained thus far strongly suggest that this is the case. These findings have already provided insights to guide the use of veterinary medicines containing high levels of zinc.

Collaborators

Mylène Blais Danyel Bueno-Dalto Martin Lessard Jacques Matte Dominic Poulin-Laprade Guylaine Talbot	Sherbrooke Research and Development Centre, AAFC
Frédéric Guay Jean-Paul Laforest	Laval University
Yan Martel-Kennes	*Centre de recherche en sciences animales de Deschambault*
Étienne Yergeau	*Institut National de recherche scientifique*

Project status

Completed in 2023.

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.