Piglet Nutrition Research Feeds Hunger for Knowledge

By Geoff Geddes, for Swine Innovation Porc

What do toddlers and pigs have in common? Apart from an appetite for destruction, they both depend on proper nutrition for a strong start in life. Researchers know this only too well, and they've responded with extensive studies on the care and feeding of piglets. From pretreatment and probiotics to post-weaning diets, science is scrutinizing this critical aspect of pork production and yielding promising results in a number of areas.

Newborn nutrition

"Micro" may mean "small," but micronutrients play a big role in piglet development. Micronutrients are essential elements needed in small quantities throughout life to support a number of physiological functions that maintain health.

The research project "Nutrients with extra-nutritional value for newborns: Micronutrients and colostral biofactors" looked at three critical micronutrients that are transferred from sows to piglets before and after birth: vitamin A, vitamin D and copper.

At one time, newborn piglets obtained these micronutrients naturally from UV light, plants and soil, but all three sources are hard to come by in the modern pig barn. This prompted researchers to look at how best to provide the three key micronutrients, examining direct transmission to the piglets and the indirect route via the sow diet.

The study found that micronutrients were most effective when provided via oral administration at 2 and 8 days of age and combined with UVB exposure every second day during lactation. When properly administered, micronutrient supplementation to sows benefited piglets through improvements to birth weight consistency and microflora.

As a next step, researchers will use these results to determine the optimal amounts and methods for the addition of micronutrients to diets. Knowing what, when and how to supplement your animals can give you the greatest return for the least investment, something every producer can appreciate.

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MICRONUTRIENTS WERE MOST EFFECTIVE WHEN PROVIDED VIA ORAL ADMINISTRATION AT 2 AND 8 DAYS OF AGE AND COMBINED WITH UVB EXPOSURE EVERY SECOND DAY DURING LACTATION.

Station for exposing piglets to UVB light (left) . UVB meter (right) . Photos: AAFC Sherbrooke Research & Development Centre

Epidermal growth factor

Whether you're a pig or a thoroughbred, being fast out of the gate can make all the difference, so researchers leave no stone unturned in giving piglets the early edge. That's especially important given the realities of modern pig farming, where producers are weaning pigs earlier and reducing the amount of milk and epidermal growth factor (EGF) they consume, thereby slowing their growth and development.

Because it supports development of the piglet's intestine, EGF, which is produced naturally in a sow's milk, is vital. Since chemically-produced EGF is too costly to be practical on farm, scientists in this study created a more cost-effective EGF supplement. Through trials on pigs, they concluded that EGF supplementation can improve the intestinal development of piglets and enhance their growth, body weight gain and gain-to-feed ratio.

They also found that as dosages increased, so too did the benefits. Though the supplement is not yet available, these results show great potential to help maximize piglet development, and the study itself is another example of research seeking viable, practical options to the most pressing issues of producers.

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EGF SUPPLEMENTATION CAN IMPROVE THE INTESTINAL DEVELOPMENT OF PIGLETS AND ENHANCE THEIR GROWTH, BODY WEIGHT GAIN AND GAIN-TO-FEED RATIO.

Post-weaning nutrition

Tapping the potential of young pigs for efficient early growth is critical, and post-weaning nutrition is a big part of that. To be practical, however, advances in such nutrition must be cost effective for producers, and that was the focus of the project "Low cost post-weaning nutritional strategies - Pre-treatment of feed ingredients to enhance value."

The study was based on existing knowledge that employing acidified grains at low moisture content improves feed intake, digestibility and growth performance in weanlings. Given that fact, scientists wondered if those same benefits could be realized when preserving high moisture cereal grains with acidification.

Inoculating high moisture cereal grain with lactic acid at the University of Saskatchewan.
Photos: University of Manitoba

While more investigation is needed on this front, preliminary results suggest that feeding acid-preserved wheat to newly weaned piglets does improve feed efficiency. Moreover, the improvements are comparable to gains made with direct acidification of diets.

In an industry where feed costs are the biggest expense by far, feed efficiency may not be everything; but it could be the one thing that separates a “red ink” operation from one that is planted firmly in the black.

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PRELIMINARY RESULTS SHOW THAT FEEDING ACID-PRESERVED WHEAT TO NEWLY WEANED PIGLETS DOES IMPROVE FEED EFFICIENCY.

Simple vs. complex post-weaning diets

Although simple solutions are rare in the pork industry, cutting the cost of post-weaning diets might be the exception. Over the years, those diets have become more complex and, in the process, more expensive. What if it didn’t have to be that way? Good science starts with asking the right question, and in this case, it led to some intriguing answers.

After testing diets of high and low complexity on farms with a variety of health statuses, as expected, pigs that were fed a cheaper soybean diet started poorly and had limited early growth. By the end of the nursery phase, however, those pigs were even with their counterparts given the more complex meals. Most importantly, both groups of pigs looked identical when they went to market and had essentially the same carcass evaluations.

For producers facing the reality of ever higher feed costs, these are promising results. If they can provide cheaper diets post-weaning without sacrificing growth, they may achieve the Holy Grail of pork production: the best of both worlds.

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PIGLETS FED WITH SIMPLE DIETS MAY START POORLY, BUT BY THE END OF THE NURSERY PHASE, RESULTS SHOW THEY CAN CATCH UP AND HAVE SIMILAR BODY WEIGHT AS PIGLETS ON COMPLEX DIETS.

Piglets studied at the University of Guelph. Photos: University of Guelph

Post-weaning diarrhea

Diarrhea is bound to make humans less productive, so why should pigs be any different? Even the best nutritional plan will fall short when intestinal problems intrude. In the past, small amounts of antibiotics have been added to diets to combat post-weaning diarrhea. But given the current concerns around antibiotic use, research went looking for an alternative, and found it in the form of feed additives.

Specifically, they tested three types of prebiotics and an organic acid salt in nursery feed. Though supplementing with prebiotics improved digestibility, it did little for piglet growth. Organic acid, on the other hand, was a "win-win" story. Not only did it enhance total tract digestibility of dry matter, crude protein and gross energy, but it also improved three critical areas of pig production: feed efficiency, average daily gain and body weight.

Studies like this really showcase the power of research, as only through controlled trials can we pinpoint which additives will work on diarrhea and which won't. This is good news for producers, as it saves them wasting time and money on a "hit and miss" approach to addressing the problem. As well, because it should lead to less incidence of diarrhea on farm, it's also good news for pigs.

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USING AN ORGANIC ACID SALT IN NURSERY FEED IMPROVED FEED EFFICIENCY, AVERAGE DAILY GAIN AND BODY WEIGHT.

Regardless of their stage of development, providing piglets with the best possible nutrition at the lowest cost is a formula for success. While each project approaches the challenge from a different angle, they're guided by a common principle: When research succeeds, so do producers.

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