

NOVEL NUTRITIONAL STRATEGIES FOR OPTIMUM SOW AND PIGLET PRODUCTIVITY

PROJECT LEADERS

Martin Lessard, Dairy and Swine Research and Development Centre - Agriculture and Agri-Food Canada (AAFC), Kees de Lange, University of Guelph and Ron Ball, University of Alberta

PROJECT OBJECTIVE

The ultimate goal was to develop unique Canadian feeding management strategies for optimum sow and piglet productivity, taking into consideration production efficiencies that include pig performance up to market weight, food safety, pig welfare and use of antibiotics. We investigated underlying mechanisms so that we capitalized on potential synergies between the different sow and piglet feeding strategies that were evaluated. Secondary goals were to further stimulate interactions among multidisciplinary (physiology, immunology, microbiology, nutrition) Canadian swine researchers in nutrition.

Feed costs could be reduced by \$2/pig or more, by using low complexity diets for piglets.



© Centre de développement du porc du Québec inc.

FINAL RESULTS

THE IMPORTANCE OF IN UTERO VS. POST-NATAL TRANSFER OF SOME VITAMINS AND MINERALS IN PIGS

(Jacques Matte and Martin Lessard, Dairy and Swine Research and Development Centre – AAFC)

A simple approach was set up to assess the importance of maternal perinatal transfer of vitamins and trace elements from sows to piglets. Globally, in terms of net balance for the newborn piglets, both the pre- and post-natal transfers are active for some micronutrients (vitamin C, vitamin B12 and zinc) while for others the placenta appears as a barrier against the prenatal transfer which is either compensated by the colostrum transfer (folates and vitamin E) or not (retinol, vitamin D, iron, copper and selenium). In this last case, piglets are likely to suffer from a deficit in these micronutrients shortly after birth and thereafter during lactation because milk is a very poor source.

Strategies are already well known for iron (injections of iron dextran) and selenium (colostrum and milk enrichment through dietary organic selenium). However, it appears that the pre- and post-natal transfers of retinol, vitamin D and copper might be insufficient for the whole lactation period and deserve to be further studied.

DEVELOPMENT OF NOVEL FEEDING STRATEGIES AIMING TO IMPROVE GUT DEVELOPMENT, DEFENSE FUNCTIONS, HEALTH AND PERFORMANCE OF PIGLETS

(Martin Lessard, Dairy and Swine Research and Development Centre – AAFC)

Results showed that dietary treatments (cocktail diet: a combination of nutraceuticals and functional feed ingredients; colostrum diet: cocktail diet + bovine colostrum; antibiotics diet) clearly influenced vitamin status after weaning as well as homocysteine blood level. Cocktail and colostrum diets affected the microbiota of both ileum and colon after weaning and after inflammatory challenge induced by bacterial lipopolysaccharides. Globally, results suggest that the colostrum diet improved intestinal health of piglets. Antibiotic, cocktail and colostrum diets had different effects on gene expression in the intestinal tissue and their actions were generally more marked on low weight piglets. It appears, therefore, that low weight piglets could benefit from the colostrum and cocktail diets even more than high weight piglets.



BIOMARKERS TO RELATE MANAGEMENT OF PIGLETS POST-WEANING TO SUBSEQUENT GROWTH PERFORMANCE, CARCASS AND MEAT QUALITY

(Kees de Lange, University of Guelph)

Results showed that feeding nursery pigs rather simple diets, based on corn and soybean meal, reduced post-weaning growth performance, but had no long-term effect on growth performance up to market weight and carcass characteristics. Indeed, pigs showed compensatory growth during the growing-finishing phase. Therefore, a reduction in feed costs of more than \$2 per pig could be obtained in the nursery phase without compromising subsequent growth performance and carcass value.

However, in the event of a severe health challenge, the use of simple nursery diets compromises the pig's ability to achieve compensatory growth and recuperate from earlier reductions in performances. Potential genetic markers were identified to help select pigs for better performances and stronger innate response against infectious agents. The impact of nursery feeding programs on the pig's ability to deal with health challenges deserves to be further explored.

Parity segregated phase feeding could reduce feed costs by more than \$10 per sow per year based on sow amino acids and energy requirements during gestation.

SOW NUTRITION DURING GESTATION

(Ron Ball, University of Alberta)

Results showed an increase in requirements for energy and all amino acids studied in late gestation compared to early gestation. These changes in nutrient requirements indicate that feeding sows a single diet throughout their entire gestation is not appropriate.

Parity segregated phase feeding with two diets is proposed to supply sows with the correct amount of nutrients throughout their life cycle. Results showed that two phases, one from breeding to 84 days of gestation, and one from 85 days of gestation to entering the farrowing room would be appropriate. The two diets suggested are one with lower amino acids content and one with increased amino acids content. Those diets can be used separately or mixed to meet sows' different amino acid requirements. The feed allowance should be adjusted according to the energy expenditure of sows and should then be greater in late gestation and for gilts.



© Martin Schwalbe, courtesy AgMedia inc