

The latest thinking on effective maintenance of good health

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If you ask your friends and relatives how they maintain good health, you are going to hear various solutions including healthy nutritious food, exercise, decreasing stress, sleeping well and possible vitamins and supplements. You will not likely hear any of your acquaintances mention that they remain healthy by pulse medication with antibiotics or low dose antibiotics supplements in the food. If your neighbour that has her kids in an old overcrowded nursery mentions that they have effectively solved kid health problems with an antibiotic cocktail in the drinking water, you would most probably be shocked. In our modern day, affluent and successful world, those antibiotic prophylactic solutions to maintain health are absurd. At the same time, we have many professionals and stakeholders in the pig industry that are promoting and supporting those antibiotic solutions as measures to maintain health in our pigs. We boost over our highly productive, efficient and cost-effective pig production, and at the same time we defend our antibiotic use as necessary for maintenance of health of our pigs.

The healthy pig production system

Antibiotics have been one of our best innovations and solutions to treat serious bacterial disease. However, the majority of antibiotics used in animal production are not used to treat sick animals, but are used to treat sick production systems. Although there is continuous quest for alternatives to antibiotics, decades of research has provided few good alternatives and therefore we need to seek solutions for health rather than treatments for our diseased production systems.¹ To minimise reliance on antibiotic solutions, we need to shift our focus from alternative drugs to optimising our production systems so that prophylactic and metaphylactic treatments become redundant. This will in the long term be cost-effective, since healthy production systems generate healthy pigs and healthy economies. The goal to reduce antibiotic use should be rephrased to a goal to produce healthy production systems. We should look at this goal as a challenge and not as a threat and take on the challenge with passion and determination. We have the knowledge and tools to create these systems in the pig sector, and can move to a higher level of health and productivity, and provide the quality products that modern day consumers are requesting.

Team work, audits, motivation

We can all improve and we should all aim to improve our production systems whatever our roles are in the industry. We are not lacking knowledge as to how to raise a healthy pig and maintain a healthy herd. The challenge for the pig producer is to determine the key factors that first needs to be addressed and find motivation to get started. A key to success in creating our healthy pig production systems is to assemble a team ranging from industry consultants, veterinarians, nutritionists, building engineer experts, owners, managers and workers. A new set of eyes with different perspectives can evaluate potential weaknesses and strengths of the production system. Audits to establish the baseline current situation and recurrent audits to monitor progress are important to keep the momentum going and to re-evaluate program and targets. Systems to benchmark the production against peers and targets that are objective and clearly defined are important to keep motivation and progress going.

Optimising health, production and reducing antimicrobial use plans

We now have an excellent opportunity to optimise pig health and productivity in an effort to reduce antimicrobial use. There are many resources and information sources to assist the individual

producer to optimise and maintain high levels of pig health and welfare in production systems that do not necessitate antimicrobial medication. European pig health experts recently ranked alternative solutions to antimicrobials. Improvements in biosecurity, increased use of vaccination, use of zinc/metals, feed quality improvement and regular diagnostic testing combined with a clear action plan were perceived to be the most promising alternatives to antimicrobials in industrial pig production based on combined effectiveness, feasibility and return on investment.²

One industry-initiated program whereby farms may get total herd audits and recommendations for enhanced animal health with resulting reduction in antimicrobial use has been developed by Alltech as an Antimicrobial Reduction Program (Alltech AB reduce). These AB reduce audits include evaluations of performance, pig welfare, pig health, nutrition, management, housing, antimicrobial use, biosecurity, and cost-effectiveness of production. Recommendations include nutrition, management, antimicrobial use strategy, biosecurity measures and nutritional strategies to optimise pig health at all stages of production. The aim of the program is to create a consistent healthy pig and make prophylactic and metaphylactic antibiotic use redundant.

Biosecurity

Disease prevention through biosecurity is very important for maintenance and improvement of good health in pig production and there is often room for improvement.³ Ghent University has shown that higher levels of biosecurity are associated with higher levels of production, decreased antimicrobial use and resistance. The Ghent University team has made an online tool available whereby farms can evaluate and benchmark their biosecurity (www.biocheck.ugent.be).

Respecting the physiological needs of the pigs

The herd-level immunity, individual pig gut health and systemic immunity, nutritional status and stress-levels, and environmental conditions all interact. Most producers are weaning the piglets at around 3 to 4 weeks of age, at an age when the passive immunity obtained through the colostrum has waned, but the piglets own active immunity is not fully functional.⁴ Many producers are protecting the piglets from disease at this point by using antibiotics in the feed or water. A later weaning with minimal mixing of litters is more appropriate for the animals' immune development and will reduce the need for prophylactic antibiotics and the associated problems around the time of weaning. This might increase costs, but costs of diseases and growth gaps around weaning are also high. Transport and trade in live pigs is another practice that imposes high physiological stress on the animals and creates a high risk of spread of diseases and this creates a need for antimicrobial medication in order to protect the animals from disease. These management systems that have evolved due to the ability to medicate the animals may not be possible in the future without prophylactic antimicrobials.

Good environmental conditions

Stocking density, hygienic conditions in pens, availability of bedding material or straw, temperature, humidity and air quality are just a few environmental conditions that have a huge influence on pig health and welfare. The ideal temperature for pigs of different body weights are impacted by ventilation rate and flooring type and many farms fail to achieve the appropriate temperature. Fresh air is essential to keep pigs healthy and vigorous. The levels of ammonia in a pig building has been associated with levels of airborne bacteria and dust, and all this need to be addressed to prevent the transmission of infectious respiratory disease.⁵ A warm, moist environment is also a perfect environment for pathogenic bacteria to thrive and propagate. Overstocking results in crowded conditions in the pens and limited time between batches for proper mechanical cleaning, drying and disinfection. The social environment includes all aspects of communication within pig groups. Mixing groups or moving pigs requires that the social order is re-established and this typically results in

aggression, stress and decreased performance. Overcrowding also imposes a social stress on the animals as they may be insufficient eating and resting space. Pig welfare is not just an ideological goal as it has big impacts on production efficiency and health.

Good systemic immunity is critical for healthy production.

Immune enhancing measures may range from genetic selection, SPF animals, optimising feed, vitamins, minerals and trace-elements, minimising mycotoxin exposure, stress reduction, vaccination strategies, pathogen exposure in gilts, colostrum production etc. Vitamins, minerals and trace elements are essential for optimal health and productivity and need to be provided in a form that allow for optimal uptake. Dietary copper and zinc, when supplied at high concentrations (copper at 100-250 ppm and zinc at 2000-3000 ppm), exert positive influences on growth rate. However, there are concerns that high levels of these minerals are excreted in the faeces and this may result in excessive accumulation of copper and zinc in soils. There are also concerns that this high level application may lead to development of resistance or co-resistance to antimicrobials.⁶ To reduce the amount of zinc and copper in feed, the bioavailability of the trace minerals can be improved by using organically bound forms (chelates) and according to EFSA, the zinc content in complete feed can be reduced by nearly 30% by including phytase in feed. Mannan-based products (Bio-Mos and Actigen) have been shown in sows, during gestation and lactation, to improve colostrum production and quality and thereby piglet immunity, survival, and growth. With our current climatic conditions and production systems with long distribution chains of feed, the risks associated with mycotoxins in feed and bedding material are substantial. This may create immune-suppression and sub-clinical disease, and it is very important to take appropriate measures to reduce mycotoxins through feed sourcing and storage, and by inclusion of a good mycotoxin binder in the feed.

Gut health and systemic health go hand in hand

Good gut health is one key to a healthy growing pig. The gut is the pig's largest organ and first line of defense against enteric pathogens and the health of the gut is critical for optimal digestion and nutrient uptake. Trillions of microorganisms inhabit the intestinal tract and form a complex ecosystem that can influence the immune system within and outside the gut and pig health in general.⁷ The most important tool for good gut health is to provide the best feed possible for the pig at all ages that meets the pigs nutritional needs. Multi-phase feeding systems and individualised systems for sows are valuable tools not only for productivity, but also for health. Particle size of feed not only influences digestibility, but can also impact the gut microflora.

Dietary supplements are tools to improve pig health and productivity. Organic acids have been used to reduce the diet pH, exert preservative effects in feed, improve palatability, impact gut microflora and reduce coliforms and diarrhoea, and increase digestibility of nutrients. Benzoic acid in weaner feed results in improvements in piglet growth rates after weaning. Prebiotics are non-digestible oligosaccharides added to feed that can be used to modify the gut microbial composition and/or activity and thereby maintain a beneficial gut microflora. Mannan-oligosaccharides or mannan-derived supplements have been shown to be beneficial in improving gut health, gut immunity, nutrient digestibility and thereby growth.⁸ Pigs fed Bio-Mos may even have greater daily gain rate than pigs fed antibiotics.⁹ Dietary fiber has potential prebiotic effects interacting with the gut microbial environment and associated lymphoid tissue.¹⁰ With alternative feed source, enzymes such as phytase and carbohydrase can promote growth and nutrient utilization and may improve gut health.¹¹ Probiotics have been shown to be able to reduce diarrhoea post-weaning, reduce *E. coli* and improve gut health.¹² However, many probiotics have shown variable and inconsistent benefits. Essential oil compounds, present in various plants and spices (such as thymol, carvacrol, eugenol) have an antibacterial activity and may be able to modify the composition of intestinal microflora and exert beneficial effects on performance. Other areas with potential beneficial effects for pigs are natural compounds such as lactoferrin, lysozyme, bacteriocins and antimicrobial peptides.

Can we maintain good health without antibiotics?

Between 2009 and 2014 the use of antibiotics in Dutch livestock decreased by 58%. This does not appear to have affected farm profits: the animal husbandry sector did not diminish in size and the average technical and economic results do not appear to have worsened. We do not maintain healthy production systems with antibiotics, we maintain sub-optimal production systems. All producers can raise the bar for health and productivity in their own herd. We have the tools, the knowledge and the motives for changes. What is your role? What is your goal? Where can you improve? Are you in training? Do you have a coach and expert advice? Are you motivated to run for the goal of a top healthy productive financially sound production? The pig industry can do this together!

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