Efficient Monitoring of Antibiotic Use on Pig Farms

Following the limitations on antibiotic use in pigs farms across Europe since the late 1990s, it has become crucial to monitor antibiotic use on farms and their microbial status, in order to protect young and growing pigs against infectious diseases. As research continues to provide commercial producers with knowledge regarding challenges to animal health and performance, the checklist of risk factors continues to grow regarding what biosecurity measures are required to keep diseases off farm, as well as environmental challenges that are ubiquitous, for example soil-borne organisms and mycotoxins. Alltech provides an audit programme which evaluates various contributing factors to on-farm productivity, including biosecurity, animal health status, mycotoxin exposure and antimicrobial use. From such individual surveys, and comparisons against research and commercial trial data, recommendations can then be given for both nutritional and management solutions that will minimise the reliance on antimicrobial treatments. The survey includes both internal and external biosecurity (Biocheck), current levels of antibiotic reliance (ABcheck) and, via the PigASSIST programme, animal health status and productivity. This allows identification of any animal health challenges that can then be targeted and minimised. In addition, feed and bedding (e.g. straw) samples are analysed for mycotoxin risk.

Example of an On-farm Audit
Indoor and outdoor pig units face very different types of challenges to animal health and productivity. For the purposes of this paper, the example of an outdoor unit is used. Many farms have good external biosecurity, for example wheel and foot baths for visitors, however internal biosecurity can be more lax, leading to challenges from feed, bedding and personnel on internal biosecurity, and overall biosecurity was below average. For all facilities, quarantine areas for purchased animal stock are recommended to monitor any incubating disease and offer treatment before mixing animals with others already on the farm. The quality of drinking water should also be taken into account – as this can be a major vector for pathogens which cause digestive disease, scours, poor productivity and even higher mortality. Farms sourcing water from bore holes are at particular risk of these and other disease-causing organisms, which infect via faecal and soil contamination.

Common On-farm Threats to Growing Pigs
Sows and growing pigs face various threats on farm – from both internal and external sources. These threats include biosecurity management systems, i.e. limiting risk factors coming onto the farm. However, some threats to animal health and performance are ubiquitous and difficult to exclude or avoid – and hence various steps can be taken to reduce their negative impact on the welfare and health of the pigs and the economics of the farm. Fungal growth in feed materials and bedding leads to the exposure of pigs to the toxins they produce. Mycotoxins cause a variety of diseases in pigs, notably major reproductive problems, including poor fertility and lactation, higher empty day rates in sows and lower piglet numbers per litter. Other problems tend to be sub-clinical and hard to diagnose, and include poor feed efficiency and higher variability in herds, leading to extra costs for drafting pigs in an all-in/all-out system.

Gut-active feed ingredients, including mannan-based supplements, have been shown to affect the development and acquisition of immunity in young pigs. Sows fed mannan-rich fractions (MRF) had increased colostrum production, higher IgG concentrations and better colostrum nutrient quality, which in turn boosts the suckling piglets’ immunity, reducing pre-wean mortality, lowers the incidence of piglet scours, increasing weaning weights and also reducing the need for medication. MRF binds pathogens in the intestinal tract, and reduces the pathogen load in the sow, often reducing wean to oestrus interval. Working in synergy, these two solutions would reduce both the mycotoxin load and bacterial infection, which is currently affecting birth, weaning weights, pre-weaning mortality from scouring piglets, and sow reproductive performance. In addition this would affect herd antimicrobial (AM) use on this unit, and would give pigs an improved start when weaned and shipped to new premises, affecting feed intake, growth rate, post-weaning mortality, morbidity, disease profile and AGP use on the nursery unit.

Practical Monitoring
The on-farm monitoring for both the Biocheck and Alltech Pig-Assist Program includes scoring for both external and internal biosecurity threats that lead to higher antibiotic reliance. External threats which are monitored include the purchase of animals and semen, transport of animals, manure and dead animals off farm, cleanliness of feed, water and personnel, control of visitors, vermin and bird control and local environmental conditions. Internal threats monitored include current disease management, farrowing and suckling conditions, rearing facilities, control of animal movements, cleanliness of equipment and general cleaning and disinfection routines. All of these factors are scored on-farm using the Biocheck system and compared with averages from other units in order to ‘rank’ the current biosecurity measures used. In general, several practices are recommended to improve biosecurity on pig farms. Firstly, a quarantine area should be set up for all animals coming onto the farm, and gilts should be held for three weeks away from the main animal housing to ensure they are disease-free. In addition, for outdoor units, this is an opportunity to slowly adapt them to outdoor living conditions, which can otherwise cause stress. Secondly, drinking water quality should be monitored and appropriately treated to ensure this is not a vector for disease. All visitors to the piggery must be signed in and out, and should be provided with clean clothing and boots to wear on the unit. Foot and wheel baths should be used at all access
points to the pigs.

The Alltech Pig-Assist Program can be used to gauge the current status of performance and health on pig farms by monitoring litter numbers and health alongside costs for rearing litters including sow empty days. This is then compared against targets for economical production on that unit – allowing the identification of areas in management and productivity where improvements can be made. This is then included in an economics model, whereby all costs of piglet production are taken into account, as are improvements (taken from research and commercial pig trial responses). This can be used to take into account any extra in-feed supplements or other costs that have been recommended from the individual farm information, and return on investment calculated.

The levels of antibiotics used on farm are now regulated in European pig farms, and most have to be administered under veterinary supervision. In our example using an outdoor farm, fluoroquinolone was being used, which is not recommended and should be replaced by another product, such as a third-generation cephalosporin. For this farm, the model for reducing reliance on AGPs by supplementing diets with MRF products was included.

The example farm used in this paper had mycotoxins present in both the straw bedding used in sow accommodation and in the feed. Thermal imaging showed fungal growth in straw bales as well as in bulk feed bins, due to poor clean out, and also leakage of water into storage areas. The greatest risks from analysing samples from this farm were identified from type B tricothecenes. These are associated with poorer feed intake and weight loss, due to lesions and other damage within the digestive tract. Sows are known to have poorer conception rates and poorer immunity (including transfer of immunoglobulins to piglets) when exposed to type B tricothecenes. In addition, lower levels of type A tricothecenes, penicillium and aspergillus toxins were detected, which reduce performance and immunity. The fact that multiple mycotoxins were found on this farm shows that pigs were at a higher risk of ingestion and exposure. From these findings, it is recommended that mycotoxin binders be used in feed to remove the threat of toxin contamination, as well as a complete clean out of both animal and feed areas at a minimal six-monthly period. The cost benefit analysis (using the current outdoor farm example) showed that, by taking on the recommended feed supplementation, a return on investment of 2.6:1 was calculated.

Conclusions

Modern scoring systems, analysis of major risk points, comparisons with responses seen in commercial and research trials and including cost benefit analysis are available for direct application on active pig farms. These will help with general biosecurity measures, as well as identifying where problems are currently occurring that will be inhibiting performance and animal health, and increasing reliance on antibiotic use. By using such systems, pig farmers will be better able to maintain their farm management practices to stay in line with retailer and consumer requirements, as well as ensuring better return on investment for pig production, leading to higher profitability per pig, even in outdoor farming systems.

References

Mc Ardle T.M., Nollet L. 2013. Effects of Actigen during gestation, lactation and starter phases on sow and piglet performance to 40 kg. Poster, Alltech 29th Symposium, Lexington, KY, USA.