HealthyLivestock

健康畜禽

Tackling antimicrobial resistance (AMR)
by increasing the health and welfare of pigs and poultry and thereby reducing the need to use antimicrobials.

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HealthyLivestock

HealthyLivestock is a research programme to study the contributions of enhanced animal health and welfare on reducing the need to use antimicrobials in pigs and poultry. The research is looking to : A reduction of the risk for animals to get exposed to disease agents; An early detection of health problems and specific diseases; An increased resilience of the animals towards disease challenges; And if antimicrobials are needed, a more precise use or alternatives. The HealthyLivestock project comprises two pillars: an EU pillar and a Chinese pillar.

Zoetis for HealthyLivestock by Theo Kanellos, Zoetis

At Zoetis, we are dedicated to supporting our customers and their businesses. Building on more than 65 years of experience in animal health, we discover, develop, manufacture and commercialize medicines, vaccines and diagnostic products, which are complemented by biodevices, genetic tests and precision livestock farming.

We know that healthier animals are part of building a healthier world, and we provide products and solutions to help veterinarians predict, prevent, detect, and treat disease across the entire lifecycle of animals. We call this the continuum of care because it spans the entire range of health solutions. We work closely with our customers to provide them the medical and technical support they need to make the right decisions about the health of animals under their care.

Responsible Use of Antibiotics

One aspect of this is promoting the responsible use of antibiotics, where we follow the principle “as little as possible, as much as necessary.” Under Work Package 6, Zoetis is developing innovative applications for poultry and pig farmers and other professionals to better inform their livestock care and productivity practices. With the correct knowledge, veterinarians and livestock producers can prevent disease or detect it early, thus eliminating or minimizing the use of antibiotics.

Minimizing the Effects of Disease with Data

Another solution that supports antibiotic stewardship and minimizes disease is the imminent POULTRYVIEW 360™ from Zoetis, a value-added flock health evaluation system that allows veterinarians and farmers to capture, document, evaluate and benchmark health status relating to the GI and respiratory tracts, skeletal/muscular/integumentary conditions, coccidiosis, immune system and others. Data relating to disease control programmes, treatment records, age, weight etc are captured and the analytics provided allow early disease intervention and reduce the need for antibiotics. Photo references for scoring in health evaluations and an educational section are provided which can be used to train new specialists working in live production.

Concerning pigs, Zoetis and our partners will run a data-driven platform of analytical tools to assess health and performance at both individual and herd level. Farm events, weights and growth rates, antimicrobial and other veterinary medicine usage will be monitored, and the option of 3D camera technology may be used to analyse behaviour for early detection of vice behaviours and health issues.

E-Knowledge Hub

The outputs of the HealthyLivestock work packages from both the Chinese and European projects will be made available through a mobile-phone friendly E-Knowledge Hub which will provide access for livestock producers and veterinarians to the latest evidence and best practice guidance which can be implemented on farm and improvements observed through the poultry and pig apps.

It is envisaged that these apps will contribute to the harmonisation of animal health practices between the EU and China and to the overall economic and environmental sustainability of pig and poultry farming.

Hatching system effect on welfare, health, and performance of broiler chickens

The Healthylivestock project aims to reduce the use of antimicrobials in Europe and China. One way of reducing the need for antimicrobials is by increasing resilience to disease challenge. Work package 2 (WP2) studies ways to improve the ability of animals to withstand or deal with pathogen challenges through welfare improvements which reduce stress, or through nutritional measures. Recently, the outcomes of two studies that have formed the basis for WP2 have been published.

The studies examined the effect of the hatching system of chickens (hatchery-hatching vs. on-farm hatching) on welfare, health and performance. One study found the hatching system to have limited effects on broiler chicken activity and general behaviours in real life. However, in test situations this study found hatchery-hatched chickens showed more active and less fearful responses compared to on-farm hatched chickens. Another study found on-farm hatching may be beneficial for broiler chicken welfare. In this study, on farm hatching was associated with reduced total mortality and resulted in dryer litter which is known to be beneficial for reducing footpad lesions. Further work is being undertaken in WP2 to investigate any effect hatching systems might have on health outcomes.

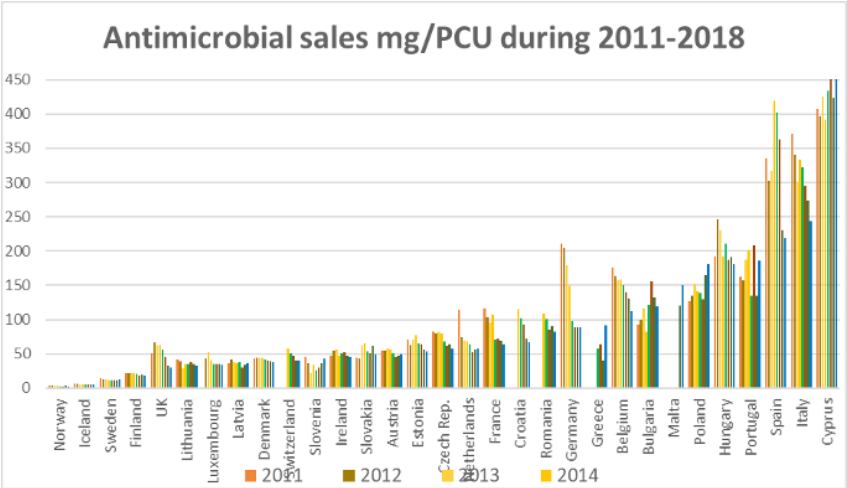
ESVAC report 2020

"The European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) project collects information on how antimicrobial medicines are used in animals across the European Union (EU). This type of information is essential to identify possible risk factors that could lead to the development and spread of antimicrobial resistance in animals"

The latest ESVAC report, published in October 2020, shows that sales of antibiotics for use in animals in Europe (reported by 31 EU countries and European Economic Area (EEA) Member States) felt by more than 34% between 2011 and 2018, With continued decreases in sales of veterinary antibiotics regarded as medically important: Polymyxins (Colistin) by -69.8%, 3-4th Cephalosporins by -24.4% and for Fluoroquinolones by -4.2% .

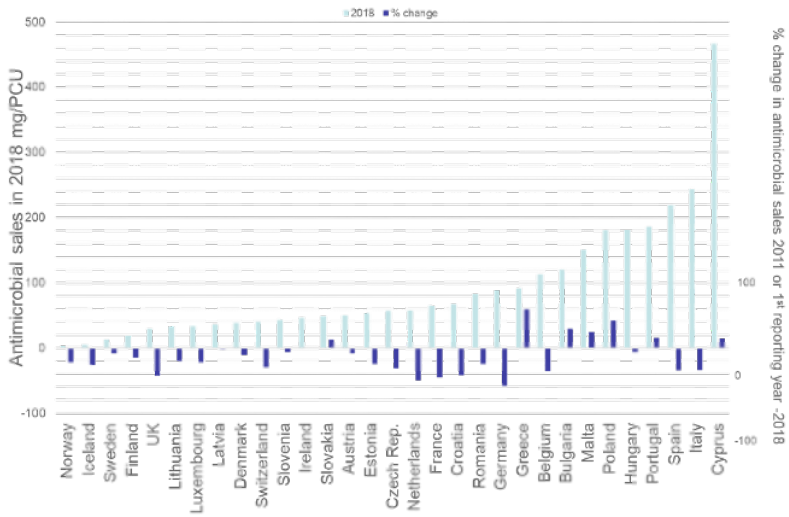
This decline can be mainly attribute to the efforts that has been done by farmers and veterinarians to enhance animal health and welfare by increasing disease prevention, improving hygiene practices and biosecurity measures, improving nutrition, making a better vaccine protocol use, and using alternative medicine. This beside the country actions as implementation of responsible-use campaigns, restrictions on use, prescription control measures, increased awareness of the threat of antimicrobial resistance and setting targets for reductions in antimicrobial sales or use. All resulting in reduce need to use antibiotics in animals.

This graph shows performance of each European country relative to each other: the situation across Europe is contrasting. Out of the 25 countries,18 countries observed a decline in sales of veterinary antibiotics overall sales have dropped by more than 5% (ranging from -6.2 % to -58.2 %), whilst there was an increase of more than 5 % in five countries during the reference period (ranging from 13.0 % to 32.7 %)



"Variations between the 31 countries in reported sales (mg/PCU) and in sales patterns are likely to be partly due to differences in the occurrence of bacterial diseases, in the composition of the animal population and in the production systems. Furthermore, there are considerable variations in terms of the daily doses used for the various antimicrobial agents and pharmaceutical forms, as well as in duration of treatment. Since, these factors can only partly explain the differences in the sales observed between the 31 countries, other factors must also be considered."

The next graph, designed by FVE (Federation of Veterinarians of Europe) based on the ESVAC report , shows the Antimicrobial sales mg/PCU in 2018 alongside percentage change in sales during 2011-2018



HealthyLivestock in the International Forum on Animal Welfare and Public Health in Beijing, China

On December 3rd 2020, "International Forum on Animal Welfare and Public Health, i.e., National Good•New•Famous•Special Welfare-friendly Product Launch Meeting" was held by International Cooperation Committee of Animal Welfare (ICCAW) in Beijing. More than 150 representatives from the Chinese government, international organizations, academia and livestock industry attended the forum.

With increasing public health awareness, animal welfare-friendly products have become an emerging trend in China. To facilitate brand-building and sales of animal welfare-friendly products, ICCAW has been authorized by Agricultural Product Quality & Safety Center of Ministry of Agriculture and Rural Affairs to be in charge of the certification, registration and promotion of National Good•New•Famous•Special Welfare-friendly Products. As an important innovation in animal welfare development, the launch of National Good•New•Famous•Special Welfare-friendly Product will become a new engine for the high-quality development of animal husbandry. In the Product Launch Meeting, the first series of National Good•New•Famous•Special Welfare-friendly products were displayed.

In the afternoon, international leaders and experts shared ideas on the theme of "animal welfare and public health". Jan Vaarten, Executive Director of FVE delivered a speech on "Animal Welfare: Fundamental to One Health", illustrating on the interplay of human, animal and ecosystem health, and EU Farm to Fork plan to better assure animal and public health. Prof. Yang Shuming, Chief Scientist of Agro-Product Quality and Safety Research Sector of IQSTAP, made a report on "How to Control Residue & Antimicrobial Resistance in Good-quality Livestock Products", sharing on HealthyLivestock project innovation in reducing antimicrobial usage and antimicrobial residue detection.

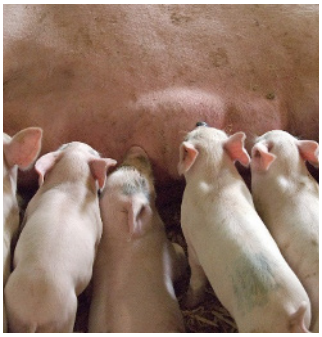
With more than 50 thousand views of the event on the live broadcast, the ideas of the event had been conveyed far and wide, bringing in more awareness and understanding of the significance of improving animal health and welfare for food safety and public health.

HealthyLivestock news from Work Package 2 - Chinese partners

Comparison Research on Pregnant Sows & Piglets in Group Housing System and Crates

The research team of Institute of Animal Sciences of CAAS carried out research on welfare-friendly farming system in terms of health and resilience improvement of pregnant sows and piglets, comparing the behavior and stress levels of pregnant sows in group housing system and crates. In the research, Large White sows were kept in the same farm in which the feeds and other environmental factors were consistent. The behaviors of standing and sham-chewing were recorded and analyzed in the early, middle and late pregnancy. At the same time, blood samples of sows were collected in each period to examine the content of cortisol and other stress hormones.

According to the results, in comparison with crates, the dog-sitting and sham-chewing behaviors of pregnant sows were significantly reduced while the exploratory behaviors increased considerably in group housing system. In addition, the hormone level of pregnant sows in group housing system was much lower than that in crates. The results showed that the group housing system was more conducive to the natural behavior expression and physical & mental health of pregnant sows.



Besides, the research also examined the resilience of the piglets of the two farming systems. Through comparing the temperatures of the piglets after LPS injection, it was found that the body temperature of the piglets of group housing sows recovered more quickly, which showed that they had better resilience. In addition, the cortisol hormone level in the piglets of group housing sows was much lower than that of the crates, indicating lower stress.

The research proved that welfare-friendly farming could reduce the stress of pigs, thus reducing disease infection risks and antibiotics use.

Comparison Research on the Effects of Antibiotics and Probiotics on Broiler Gut Health

The research team of Nanjing Agricultural University carried out a study on the effects of antibiotics and probiotics on the gut health of broilers. In this study, 120 one-day yellow-feathered broilers were randomly divided into three groups [control group (basal diet), probiotics group (basal diet plus drinking water supplemented with probiotics, 100mg/bird/day), antibiotics group (basal diet plus antibiotics, bacitracin zinc 16.5mg/kg and colistin sulfate 3.3mg/kg)]. Samples were collected at 28 days and 42 days to compare the effects of probiotics and antibiotics on the growth performance, intestinal structures, ammonia & nitrogen content in feces, VFA content in cecum, cecal microflora and cecal antimicrobial resistance genes of broilers.

The results showed that both antibiotics and probiotics could significantly improve the growth performance of broilers, but compared with antibiotics, probiotics had the following advantages: (1) it significantly improved the development of intestinal epithelial villi; (2) it significantly reduced the emission of ammonia and nitrogen; (3) feeding probiotics could create a more favorable microbial population by increasing beneficial microbes and reducing harmful microbes & methanogens; (4) feeding probiotics could significantly reduce the number of antimicrobial-resistant bacteria.

Probiotics, as live bacteria that can colonize in the intestine, can improve gut immunity through restitution of intestinal barrier function, is considered as a highly promising alternative to antibiotics. The results showed that probiotics could regulate intestinal micro flora, produce short-chain fatty acids and vitamins, assist in digestion & metabolism, improve growth performance, and enhance immune response of broilers.

Interview with Prof. LI Jianxi

Professor and Vice Director of Lanzhou Institute of Husbandry and Pharmaceutical Sciences of Chinese Academy of Agricultural Sciences (LIHPS)

The project team of LIHPS has made innovative research achievements and products of traditional Chinese veterinary medicine (TCVM). What are their benefits? What is the prospect of application?

LIHPS has created four national first-ranking veterinary drugs, and obtained 77 certificates of new veterinary drugs and feed additives. Most of them have been successfully transferred to TCVM manufacturers, bringing more than 30 million yuan of transfer fees. The TCVM preparations created by LIHPS have the functions of disease prevention & control for common diseases, infectious diseases and parasitic diseases, immune regulation, disease treatment and production improvement. The transferred TCVM preparations have gained some market. The annual sales volume of some TCVM products exceeds 20 million yuan.

TCVM drugs have many advantages, such as significant prevention & control effects, few side effects, no or little residue in food, and little drug resistance, etc. Because of the little harm to food safety and unique curative effect on certain types of diseases, it's likely that TCVM drugs will gradually replace chemical drugs in some fields with great potentials and prospects.

In 2020, with the implementation of the national policy mandating veterinary antibiotics reduction, the disease prevention & control functions of TCVM have become favored. What are the challenges in promoting TCVM and how to cope with them? How to popularize TCVM?

There are mainly four challenges: the exact effects of TCVM; the low dosage; the cost control; the influence of Western medicine standard on TCVM assessment.

TCVM industry should meet the challenges from the following aspects: First, change the farming concepts, and make TCVM as a major alternative in disease prevention, control and treatment and growth promotion. Secondly, develop a variety of TCVM preparations to meet the different needs of producers. At present, the market demands for TCVM are mainly the following categories: TCVM with antibacterial effect; TCVM with growth promotion functions, mainly drugs with functions of digestion aid, spleen and Qi enhancement; TCVM with insect repellent effect. The existing TCVM drugs are not enough to deal with the number of livestock diseases.

To popularize TCVM, the following work should be done: Firstly, change development concepts. The livestock industry needs to put more efforts into health improvement and disease prevention, thus improving performance and meat quality. The industry should explore in the production of safe and good-quality animal-origin food with the help of TCVM. Secondly, it's necessary to raise public awareness of TCVM application and explore in the international promotion. Thirdly, TCVM industry needs to make innovation and develop new preparations and products while taking the clinical efficacy as the assessment standard and health care as the core concept. At the same time, the industry needs to improve the facilities to guarantee the quality. Finally, TCVM talent education and training should be enhanced, and TCVM should be incorporated into the veterinary work system to promote the widespread use of TCVM.

China and EU cooperation is an important part of the project with mutual sharing and learning from each side. What do you think of that?

Through more than two years of cooperation, we think that some practices and experiences of the European partners are inspiring. Firstly, the EU partners attach importance to the overall design of the international cooperative project. The project partners discuss on the whole plan together and its feasibility. Secondly, the EU partners have good communication with annual reporting. The problems are identified and the necessary adjustments are made accordingly. Thirdly, within each work package, the partners report on the progress regularly to facilitate the monitoring. Fourthly, there is a sound support system of international scientific research projects.

At present, green growth and sustainable development is a global trend. As a truly ecological medicine, TCVM has received increasing attention worldwide. How can TCVM be more effectively promoted in the international market?

To promote TCVM in the international market, the following five aspects should be considered: Firstly, strengthen the publicity of TCVM and focus on its environmental and pollution-free benefits. Secondly, strengthen international cooperation and exchange in TCVM. Making use of advanced production technology worldwide, transform the quality, package and after-sale service of TCVM products. Thirdly, develop an international TCVM standard by referring to the veterinary drug management systems of the US and EU. Fourthly, making use of the natural resources of Chinese herbal medicines, develop new TCVM products, introduce foreign investment and develop large-scale production to reduce cost, thus improving competitiveness. Fifthly, learn from advanced marketing strategies abroad and promote TCVM with effective media promotion based on the characteristics of TCVM.

Interview with Paolo Ferrari

Senior Researcher at the Research Centre for Animal Production (CRPA), Work Package 1 leader

What can you tell us about biosecurity importance as one of the HealthyLivestock Project strategies?

The application of strict criteria of external and internal biosecurity to pig farms has become, in recent decades, an increasingly important priority for farmers to defend their animals against epizootic diseases (e.g. PRRS, PED, ASF) and themselves against zoonoses (foot-and-mouth disease, swine flu), which are spreading more easily in the increasingly globalised world. Today a pig farm cannot reduce the use of antimicrobials, fight against anitimicrobial resistance and guarantee the health and productivity of its animals without following strict biosecurity criteria.

Can you share with us any interesting outcome from WP1 that is achieved or about to be achieved?

The most interesting WP1 outcome is the development of an innovative BiosEcurity risk Assessment Tool (BEAT), aimed at developing farm tailor made health plans, and of a related protocol to monitor the efficacy of such health plans, by means of biomarkers, assessed clinically though the observation (i.e. coughs, feaces, pluck and skin scoring in pigs; foot pad dermatitis in broiler chickens) of animals' representative samples or by sampling and analyzing organic matrices (i.e. pig blood/serum for PRRS and haptoglobin, pig hair for stress related hormones). BEAT has been validated by European scientists involved in WP1 with the contribution of official and practitioner vets. Farmers are involved directly, in collaboration with their vets, in the assessment of biosecurity risks and in the discussion and development of tailor-made health plans. Farmers may evaluate the benefits of their health plans and provide their feed-back opinions by filling in a specific questionnaire.

Looking forward for the WP1 outcomes, what do you think will be the implication in the field for the farmers and veterinarians ?

Results of WP1 are directed to limit antimicrobial resistance and to increase farm biosecurity and animal health and welfare by:

- involving farmers, together with their vets, in assessing the biosecurity risks in their farms through an innovative assessment tool (i.e. BEAT) and in developing a farm specific health plans, taking into account their views, roles, knowledge and priorities
- increasing farmer's awareness and knowledge on biosecurity needs and related standards (i.e. benchmarking)
- providing a protocol to monitor and efficacy of an health plan.
- BEAT outcomes can also be used to benchmark multiple farms

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