



Innovation in action

Novel non-antibiotic treatment of multi-drug resistant organisms in poultry

Research capability

> Allermuir Avian Innovation and Skills Centre

The only poultry research facility in the UK that can accommodate scientifically-sound replicated trials all the way from small-scale pilots through to testing ideas under near commercial conditions.



Challenge

The use of antimicrobial treatments in agriculture is vital in protecting animal health and aiding the production of safe and nutritious food. However, overuse of antibiotics in the livestock sector is attributed to the rise in multi-drug resistant (MDR) bacteria.

MDR bacteria have been identified in large numbers of animals and raw food products, representing a major risk to public health and food system security. This is especially a problem in China and developing countries which rely heavily on animal products for nutrition and livelihoods, with chicken being the fastest growing protein source.

Action

CIEL is supporting a UK-China consortium that secured vital funding to develop a new non-antibiotic antimicrobial treatment that could control the spread and development of antibiotic resistant pathogens in poultry. The project is led by UK company GAMA Healthcare, best known for their infection control products in hospitals. Working alongside GAMA Healthcare and CIEL are Scotland's Rural College (SRUC) and Shanghai Veterinary Research Institute.

Studies centre on developing an alternative antimicrobial treatment to conventional antibiotics by coupling a cancer medicine delivery system (microparticles) with a new class of short-lived antiseptic, which will be applied to reduce MDR bacteria on chicken farms. The technology, held by Aga Nanotech – a subsidiary of GAMA Healthcare – can be customised to meet the specific needs of the end-user, delivering a toxic payload to bacteria present within the animal and can be produced cheaply and safely, making it suitable for the agricultural/veterinary market.

Early research has shown the loaded microparticles to be effective in treating antibiotic resistant bacteria and the particles have been successfully manufactured and quantified with the required levels of active ingredient.

UK trials to understand the impact of the novel antimicrobials on animal performance and gut microbiome have been carried out within the Allermuir Avian Innovation and Skills Centre (AISC), developed by SRUC and CIEL. The Centre is the largest capacity research facility of its kind in the UK and the only one that can accommodate scientifically sound, replicated trials under near-commercial conditions.

Early results at the AISC indicate good uptake of particles by the birds when mixed with feed. Work is now underway at GAMA Healthcare to optimise the particles to maximise shelf-life stability ready for a larger UK trial.



Impact

Success will result in a reduction in antibiotic usage within the wider Chinese poultry sector (broilers, layers, duck, geese, turkey) and the consequent reduction in risk of transfer to human population.

Farm profitability could improve through better and cheaper access to treatment options, lower bird mortality through reducing losses caused by AMR poultry pathogens, and growth enhancing potential. Plans include extending the technology to other livestock species. This step change in productivity and profitability will lead to reduced poverty through more sustainable production systems.

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