Innovate UK | Business Connect

Farmed animal and aquaculture SPARK Award winners

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Projects funded and supported by Innovate UK Business Connect.

Upcycling poultry waste into sustainable protein ingredients for aquaculture feed

Project Partners: Advanced Food Innovation Centre, Sheffield Hallam University and Kera Protein Ltd (Kera)

This project, led by the Advanced Food Innovation Centre at Sheffield Hallam University in partnership with Kera Protein Ltd, aims to transform low-value poultry waste, specifically chicken intestines, into a high-value, functional protein ingredient for aquaculture.

By converting an abundant by-product into a nutritious, peptide-rich hydrolysate, the project supports both poultry and aquaculture sectors through a sustainable, circular-economy approach. The focus is on developing a next-generation hydrolysed protein, produced through an optimised extraction and hydrolysis process that releases smaller, highly functional peptide fractions. Scientific evidence shows that smaller peptides are more rapidly absorbed by aquatic animals, improving growth performance, gut health, and immune function. Understanding and controlling peptide size is therefore central to enhancing product functionality and enabling future applications.

The project will optimise the hydrolysis process through adjustments to physical conditions, enzymatic selection and dosage, and optional chemical enhancements. The resulting extracts will undergo detailed analytical characterisation, including peptide size distribution, amino acid profiling, and functional assays. Bioactivity will be assessed through in vitro and, where feasible, in vivo tests to validate antioxidant, antimicrobial, or immunomodulatory effects. This work will deliver a refined, reproducible process for producing a consistent peptide-based ingredient suitable for aquafeed, supported by data-driven evidence of nutritional and functional performance. Looking ahead, the knowledge generated will provide a foundation for expanding poultry-by-product valorisation into wider food and feed applications. Overall, the project contributes to waste reduction, resource efficiency, and food-system resilience by upcycling underused poultry by-products into valuable, science-led nutritional solutions.

Early detection of welfare issues impacting production in poultry

Project Partners: University of Surrey and AviaSenze Ltd

Health monitoring in commercial poultry systems remains a persistent challenge, with major implications for productivity, welfare, and biosecurity. Early-life health is a critical determinant of flock performance, and evidence consistently demonstrates that chick condition during the first weeks of life strongly influences yield, growth rate, feed efficiency and survival to harvest. However, current industry practice of monitoring water consumption provides only retrospective insights, often identifying welfare issues only after disease establishment and irreversible performance losses.

This project aims to advance the Aviasenze platform launched in 2025, building on pilot work previously undertaken between Aviasense and Surrey through the integration of novel artificial intelligence (AI) analytics. The proposed innovations will enable real-time behavioural and environmental data interpretation to identify early deviations indicative of health compromise. Preliminary studies suggest that this approach could predict health issues several days earlier compared with existing monitoring methods, allowing for timely interventions.

Early detection using advanced AI facilitates evidence-based predictive decision-making, including the targeted use of therapeutics, precise environmental control, and rapid isolation of affected groups. These actions can reduce overall antibiotic reliance, mitigate the spread of infectious disease, and contribute to more efficient food supply and reduced on-farm waste. By addressing a critical and currently unmet need within UK poultry production, this research will deliver scientifically validated, farm-relevant evidence of system performance. The anticipated outcomes include improved welfare standards, enhanced productivity, and strengthened environmental sustainability. The results will provide a scalable, cost-effective early-warning framework with strong potential for rapid commercial and sector-wide adoption.

LANO-SHRIMP: Lanolin as a functional feed additive for shrimp aquaculture

Project Partners: Swansea University and LanoTech Ltd

This project will test whether lanolin, a natural lipid by-product of wool production, can act as a functionally beneficial feed additive in marine crustacean aquaculture. Whilst there is strong commercial interest in novel functional ingredients that improve animal health and growth performance, many current lipid sources are either expensive, derived from finite marine resources (e.g. fish oils), or carbon-intensive to produce.

Lanolin is readily available in the UK as an agricultural by-product and contains long-chain fatty acids that may enhance crustacean immunity, digestive performance, and overall condition, but it is currently untested. This proof-of-concept trial will be delivered within recirculating aquaculture systems (RAS) at Swansea University's Centre for Sustainable Aquatic Research (CSAR), testing the addition of lanolin to existing commercial feeds. Shrimp growth, welfare, and gut condition will be explored in relation to different inclusion levels. If lanolin can be incorporated into shrimp feeds without costly processing, this project will demonstrate a sustainable, UK-sourced, aquaculture feed input that could reduce reliance on fish-derived oils whilst improving crustacean performance.

This project aims to open new markets for lanolin within the aquaculture sector, aligning with circular economy principles and strengthening links between two major UK primary sectors: agriculture and aquaculture.

Precision calf health and stress monitoring

Project Partners: University of Reading and Cambridge Animal Technologies Ltd, trading as Smartbell

This project aims to advance calf health and welfare by enhancing the WellCalf rearing system—a sensor-driven decision support tool for farmers—through collaboration between the University of Reading (UoR) and Cambridge Animal Technologies Ltd (CATL).

Diseases such as Bovine Respiratory Disease (BRD) and Neonatal Calf Diarrhoea (NCD) are major challenges for UK dairy farms, affecting 48.2% and 45.9% of calves per farm respectively. BRD alone costs the UK dairy industry an estimated £60 million annually. These diseases cause far-reaching impacts beyond visible symptoms, including impaired growth and reduced milk yields in adulthood, undermining farm sustainability. Current detection methods rely on labour-intensive visual checks, which often miss early warning signs that could enable rapid treatment and reduce severity and duration.

This innovation combines high-resolution behavioural data with machine-learning (ML) algorithms to detect subtle changes linked to disease onset and stress events. These will be integrated into the WellCalf system. The study will collect detailed behavioural and health data from 120 calves under commercially relevant conditions at the UoR's Centre for Dairy Research (CEDAR). These data will be integrated into CATLs sensor platform, enabling farmers to access real-time insights for proactive herd management.

The project supports the GB Calf Health Strategy 2025–2030 by providing evidence-based tools for best-practice care. By reducing disease burden, improving growth rates, and lowering antibiotic use, the technology will deliver economic benefits for farmers and contribute to net zero goals. It also strengthens UK leadership in the growing global precision livestock market, with potential for international scalability.

IN-CH4RGE: Identifying novel biomarkers for CH4-regulating gene expression

Project Partners: University of Reading and Antler Bio Ltd

This project's main objective will be to determine whether gene expression can be used as a biomarker for enteric (digestive system) methane emission, in high yielding dairy cows.

The project will lead to development of new features with Antler Bio's cutting-edge decision support tool for dairy farmers, EpiHerd. This will enable dairy farmers to make short and long term changes to their herd management in order to reduce enteric methane emissions and meet sustainability targets, whilst maintaining optimum health and welfare. Enteric methane emissions from ruminant livestock account for the major proportion of the UK agriculture sector's methane emissions, and the sector has pledged to achieve net zero by 2050.

Despite recent developments in methane mitigation measures (including dietary manipulation through synthetic and natural feed additives that directly target rumen methane-producing microorganisms, and potential future selective breeding programmes), measuring methane emissions on-farm remains a technical and economic challenge. A new epigenetic (gene function) approach to managing dairy cow productivity and health may offer a solution to this, so management interventions can target specific cows, both in the short and long term. The approach utilises knowledge of a likely correlation between methane emissions and gene expression.

This project will explore this possibility through a pilot study at the University of Reading's Centre for Dairy Research, with groups of lactating dairy cows producing different amounts of methane. Epigenetic and phenotypic data from these animals will inform an evaluation of gene expression, in order to identify new biomarkers of methane emission.

Evaluation of a novel seaweed-based functional high-protein feed and its sustainable production process

Project Partners: Biorenewables Development Centre and MariCura Ltd

MariCura Ltd and the Biorenewables Development Centre are collaborating to validate a novel seaweed-based functional high-protein feed ingredient intended to support more sustainable production across the UK farmed animal and aquaculture sectors. The feed ingredient is produced through an innovative zero-waste biorefinery system designed to make the best use of all the seaweed components while generating additional high-value co-products for food, feed, nutraceutical, biopharmaceutical and agricultural applications.

The project will assess the nutritional, functional and digestibility characteristics of this novel feed ingredient and will also characterise three output streams generated during processing. Understanding these streams is important for demonstrating the circularity and resource-efficiency of the system and identifying further opportunities to strengthen its environmental and economic performance. By providing a locally produced alternative to imported soy and fishmeal, the innovation has the potential to reduce pressure on arable land, water use and carbon emissions, while supporting improved animal health. Establishing a viable market pathway for seaweed-derived feed ingredients will also accelerate the expansion of the UK's emerging seaweed farming sector, strengthening domestic production capacity and delivering wider economic and marine environmental benefits. The analytical data generated will inform forthcoming techno-economic and life-cycle assessments, which are essential for evaluating the broader environmental and economic performance of the system.

The project aligns closely with industry priorities to improve feed sustainability, enhance nutritional efficiency and reduce reliance on land-intensive crops. Outputs will support the wider adoption of seaweed as a resilient, UK-relevant feedstock and position both partners for further R&D and scale-up activity.

Solving larval production for UK shellfish aquaculture using phages

Project Partners: University of Glasgow and Esox Biologics

This project will support the sustainable growth of the UK shellfish aquaculture sector by developing innovative, environmentally responsible solutions to improve larval survival in hatcheries. Shellfish farming is a valuable component of the UK's blue economy, but production of key species such as oysters, mussels, and scallops has declined in recent years.

A major constraint on recovery and growth is the high mortality of larvae during hatchery rearing, much of which is caused by bacterial pathogens—particularly Vibrio species. With traditional antibiotic treatments no longer effective or permissible, there is an urgent need for new health management tools that support reliable, biosecure spat production.

The project brings together expertise from Esox Biologics, the University of Glasgow, and the Becky Meyer Centre for Phage Research at the University of Leicester to develop phage-based approaches for controlling pathogenic bacteria in bivalve hatcheries. Phages—viruses that specifically target bacteria—offer a promising, highly targeted and environmentally benign alternative to antibiotics. Esox Biologics will apply advanced metagenomic methods to identify harmful bacterial strains present in UK hatcheries, while the University of Glasgow will conduct controlled larval trials at its hatchery facility on the Isle of Cumbrae. The Becky Meyer Centre will isolate and characterise candidate phages capable of controlling these pathogens. Through this collaborative effort, the project will generate the scientific evidence and prototype phage formulations needed to support future commercial development. The outcomes will contribute to more resilient hatchery production, helping unlock the growth potential of UK shellfish aquaculture while promoting sustainable and low-impact farming practices.

Non-invasive diagnostics for oyster hatchery production

Project Partners: The University of St Andrews and NativeAqua Ltd

The native oyster is an important ecological species which is in serious decline in the wild due to overfishing. Currently hatcheries are unable to meet the demand from the aquaculture industry and the seed which is produced tends to have poor growth and robustness. Remaining strains are genetically impoverished due to a lack selective breeding strategy. Native Aqua is using modern selective breeding techniques to produce a bloodline with good genetic diversity, fast growth and strong robustness. This will involve careful pedigree management by genetic analysis, which is presently very difficult with oysters as the shell prevents access to soft tissue.

This project will develop an innovative, non-destructive way of obtaining genetic material from live oysters without harming them in any way. It requires no chemicals and no tissue damage and delivers accurate genotype data for pedigree and sex analysis, greatly improving hatchery efficiency.

Ovation Agriculture

Project Partners: University of Glasgow and Ovation Agriculture

Ovation Agriculture is developing the first cattle-specific dental gag designed to make oral examination and treatment safe, practical, and routine in cattle herds. This project partners with the University of Glasgow to validate the device's design, usability, and clinical effectiveness through controlled trialson twenty cattle: ten dairy cows and ten beef cows of mixed ages.

The full project budget will be allocated to the University of Glasgow, supporting veterinary labour, cattle access, clinical facilities, welfare monitoring, and production of an independent evaluation report. These trials will assess the fit, comfort, and stability of the dental gag during examinations and explore the feasibility of performing essential preventative treatments such as rasping and floating. This work will provide the first formal scientific evidence validating the effectiveness of the tool, laying the foundation for wider adoption across the veterinary sector. Routine dental care can significantly improve cattle welfare, reduce involuntary culling, increase feed efficiency, and lower unnecessary antibiotic use. The findings will directly support future commercial development, training programmes, and large-scale impact trials.

The project represents a crucial step in establishing routine cattle dental care as a new and essential component of sustainable livestock management.

Development of a water treatment system for artemia culture to remove residual feed and waste

Project Partners: Swansea University and Aquanzo

This project will develop and evaluate an advanced water-treatment solution to improve productivity, sustainability, and animal welfare within the aquaculture sector. Aquanzo and Swansea University will collaboratively develop an advanced flocculation system to improve the treatment of process water in Artemia production.The innovation addresses key inefficiencies associated with current mechanical strainers, which are labour-intensive, prone to failure in saline environments, and unsuitable for commercial-scale operation.

By integrating a gentle, mechanical-free, high-efficiency waste-removal technology into existing Artemia bioprocessing systems, the project aims to deliver measurable improvements in water quality, biomass yield, operational cost reduction, and overall system resilience. The project will generate a proof-of-concept demonstrator and a clear pathway to commercialisation. Its outcomes will support the wider aquaculture and marine-ingredients sector by enabling more sustainable, scalable, and economically viable production of premium Artemia-based ingredients.

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Further information

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