

Reliability diagnosing cattle diseases

A Freedom EVO® 150 workstation is providing the Central Diagnostic Laboratory at SAC Consulting with reproducible and reliable ELISA-based screening for Johne's disease and other bacterial and viral pathogens in cattle. The system has increased the laboratory's throughput by three-fold compared to manual processing, to an average of 1,000 samples a day.



SAC Consulting, part of Scotland's Rural College, serves the farming community across Scotland and the North of England, providing laboratory testing, support and advice on all aspects of rural enterprise, from agronomy, livestock and dairy services to disease surveillance, farm animal diagnostics and environmental consultancy. SAC Consulting: Veterinary Services (SACCVS) – comprising eight disease surveillance centers and a Central Diagnostic Laboratory – offers a full spectrum of diagnostic testing services, including viral screening for cattle diseases such as BVD (bovine viral diarrhoea), IBR (infectious bovine rhinotracheitis) and Johne's disease.

To cope with its growing workload, the Central Diagnostic Laboratory has invested in a number of automated solutions to improve the throughput of its diagnostic assays, as Josh Bird, Senior Scientist at SACCVS, explained: "Ever-increasing biosecurity measures to prevent the spread of diseases harmful to the farming industry have led to a huge rise in the number of samples coming into the laboratory, and the throughput necessary was too high for successful manual testing to continue. It was the storage and tracking of samples, as well as the associated paperwork – rather than the assays themselves – that were causing issues, creating a logistical nightmare.

We looked at automation as a way of streamlining the laboratory workflow, and chose a Freedom EVO 150 platform to handle our ELISA-based testing, as this seemed to be the best system on the market for our needs."

The workstation was delivered in late 2009, and was originally set up to perform Johne's disease testing, the laboratory's largest single test in terms of sample numbers at that time. The platform is fitted with both a Robotic Manipulator Arm and an eight-channel Liquid Handling Arm using fixed tips, as well as a Sunrise™ microplate reader and a HydroSpeed™ plate washer, plus an incubator, hotels and, importantly, a PosID™ barcode reader. Josh explained: "As part of our Premium Cattle Health Scheme, barcoded labels are sent out to farmers or vets and put straight onto tubes when blood samples are collected, making it easy to match each sample to the associated paperwork.

"The main benefits of the Freedom EVO platform are its reproducibility, capacity for unattended overnight runs and reliable sample tracking, without any missed samples; we certainly feel we have got our money's worth."

These samples are booked into our LIMS database before we even receive them, so we can trace everything quite easily by using barcode scanners."

"The typical throughput of the Freedom EVO is 12 plates per day, each containing 88 samples and eight controls, equivalent to nearly 1,000 samples. The platform is used in conjunction with a robotic microplate replication system, which uses our LIMS sample tracking software to automatically generate daughter plates for testing on the Freedom EVO, reducing the set-up time for a six plate run from 45 minutes to just 5 minutes. We are also hoping to directly integrate the Freedom EVO with our mother/daughter plate system in the near future, giving us the capacity to do three or four runs daily, processing almost 2,000 samples."

Josh continued: "As our testing requirements changed, we also automated both our BVD and IBR test kits on the Freedom EVO platform, and this gave us far more reproducible results compared to manual processing, with variability around 5% over multiple runs. In addition, we are validating our leptospirosis testing kit – an assay known for enormous variability between individual laboratory staff – on the Tecan platform, and have generated some very promising data. As it is computer controlled, processes are carried out exactly the same way every time, with incubation times accurate to the second, and this has certainly helped to improve the reproducibility.



We have never had any problem with carry-over between samples or assays using the fixed tips, and a weekly flush of the system with 50 % ethanol followed by distilled water prevents build-up of contamination.”

“The system is easy to use, and I really like the Freedom EVOware® software; it is very user friendly and intuitive for scientists who have no IT background. Because there are separate commands for everything, once you understand the basics, you can build up complicated programs and create multiple options, depending on the requirements of your workflow. This is particularly useful in a veterinary testing environment, where we continuously have to adapt and change in response to upgrades in testing kits or new disease threats. There are two of us responsible for programming the system, with the aim of making it as easy as possible for the other staff; they can simply load the samples and select the correct options from the menu.”

“The main benefits of the Freedom EVO platform are its reproducibility, capacity for unattended overnight runs and reliable sample tracking, without any missed samples; we certainly feel we have got our money’s worth. All the people at Tecan that I have been in contact with are really nice and approachable, easy to get hold of and go out of their way to help us. They always respond within 24 hours, and our local Tecan engineer is usually at our laboratory the next morning if we require on-site help,” Josh concluded.

To find out more on Tecan’s veterinary diagnostic solutions, visit www.tecan.com/veterinary

For more information on SAC Consulting, go to www.sruc.ac.uk/info/20005/sac_consulting



The Freedom EVO typically processes almost 1,000 samples a day