BovAlert

Priority Animal Health Testing

Institute of Technology Tallaght
Institiúid Teicneolaíochta Tamhlacht

synergy centre

A novel device for on-farm liver fluke diagnosis in dairy animals

BovAlert is an electrochemical diagnostic device which tests the milk of animal herds for liver fluke, providing quick and easy information regarding disease status.

The technology consists of a handheld electronic reader and an assay card for on-site field testing and validation.

An animal milk sample is applied to the card, which contains various reagents required for the specific testing procedure. Once the card is inserted into the reader, the test begins.

The process reduces test times from approximately one week in a standard laboratory to a 10-15 minute field test.

The test results allow the dairy farmer to take action against liver fluke disease which has a major impact on livestock productivity, particularly beef and dairy.

Liver fluke disease causes annual losses estimated to be around €2.5 billion to livestock and food industries worldwide. The loss to the Irish industry is valued in the region of €90 million annually. Economic losses caused by liver fluke are mainly associated with a decrease in meat and milk production.

Depending on the degree of infection, liver fluke may cause a reduced meat production of up to 20% in cattle and up to 30% in sheep, and a reduction in milk production of up to 8% in cows.

Fertility can suffer and beef cattle affected by fluke may take an extra 80 days to reach market weights.
(Animal Health Ireland, 2011)

As well as liver fluke infection detection, this technology can potentially be used to test for other animal parasitic diseases such as stomach worm as well as human conditions.

Applications

BovAlert provides a novel on-the-spot testing technology for disease control on farms.

The technology platform can be easily reconfigured to detect analytes of interest in the following Industries:

- Food and beverage manufacture
- Environmental assessment
- In-vitro diagnostics
- Pharmaceutical process control
- Pathogen detection

Opportunity

On-the-spot testing technology has yet to be commercially realised for disease control on farms. BovAlert provides a mobile electronic system for early diagnosis of parasitic and infectious diseases.

In July 2000, Food Harvest 2020 (an Industry & Dept of Agriculture group) set a high profile target of 50% milk output expansion by 2020. Irish dairy farmers have bought into this plan and have been investing in expanding their facilities and herds.

BovAlert can help to ensure this target is met through the detection of liver fluke in cows, reducing time and money spent on treatment and ensuring milk production is at its maximum.

Advantages

BovAlert offers a number of unique features:

- The testing kit enables rapid and quantitative measurement of anti-Fasciola (liver fluke) antibodies in milk and sera.
- BovAlert facilitates out of laboratory testing and produces results in 10-15 minutes.
- With BovAlert, minimal end-user input is required (sample in, result out).
- The technology is capable of multiplexing and being expanded to detect a wide variety of herd diseases.
- Each assay card is single-use disposable and overall the technology is very cost effective.
- BovAlert will also aid veterinary surgeons in their diagnosis of liver fluke in herd animals.

Right:
Laboratory Prototype of the
BovAlert Reader and Assay Card

> "Liver fluke disease causes annual losses estimated to be around €2.5 billion to livestock and food industries worldwide."

Stage of Development

BovAlert was developed by researchers at the Microsensors for Clinical Research and Analysis (MiCRA) centre in the Institute of Technology Tallaght (ITT Dublin).

DIT Hothouse is currently seeking expressions of interest from companies interested in licensing and developing the product.

An initial European patent application on the 'Micro-reagent handler and cartridge assembly' was filed in 2012 - EP2012/192551. A PCT patent application was filed in 2014 - PCT/EP2013/073876.

Prototyping and validation of both the electrochemical chip and the display module have been completed.

The technology currently consists of:

1. A small, lightweight touch pump fluid injector and reagent cartridge, that is capable of storing and pumping small volumes of liquid from one location on the cartridge to another.
2. Custom designed reader and software to identify liverfluke infected milk samples from the assay card.