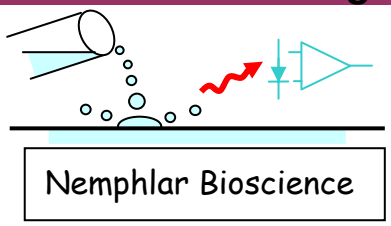
Final Report Summary

Feasibility of Producing a Small Inexpensive Chemilumimeter for Routine Diagnostic Testing



Giltech Ltd www.giltech.biz

Nemphlar Bioscience Ltd

University of Strathclyde www.strath.ac.uk

The TTOM Project

Biological diagnostics based around acridinium ester chemi-luminescence assays are extremely sensitive and can detect a very large range of target molecules or organisms. The technique is accurate and specific.

Two problems have hitherto limited its use to large expensive research instruments:

1. The need to measure very small amounts of light necessitated the use of a photo-multiplier tube.
2. The need for an inert pump to deliver (moderately aggressive) chemical reagents that initiate the flash.

If less expensive methods could be found to measure the light output and to deliver the chemicals then an inexpensive handheld instrument could be designed. In principal such an instrument would have wide applicability.

In the TTOM project we proposed to address these two points by:

1. Optimising the sensitivity of semiconductor detectors for use in this application (Nemphlar Bioscience Ltd).
2. Stabilising the reagents by incorporating them in gels (Giltech Ltd).

The department of immunology at Strathclyde University (Prof. W. H. Stimson) has a great deal of experience with these assays and it was their role to provide the immunology and chemistry support.

Results and Work Completed

Strathclyde University (Immunology) developed two assays, one for aflatoxin and the other for a bacteria common in fish farms. These were chosen because assays for many other target pathogens can be developed from simple modifications of these.
The reagents were successfully incorporated in gels and prototype consumables were made which should be capable of delivering the reagents successfully.
A number of possible semiconductor detectors were examined. An optimised circuit using a single photodiode gave the best results. The sensitivity was roughly 30 times less than the photo-multiplier tube to which it was compared. The operation of the prototype instrument was demonstrated using the assays developed at Strathclyde.

Conclusions and Outcomes

We have demonstrated that it should, in principal, be possible to design such an instrument. We are currently seeking funding to further develop and commercialise it.