



MESTECH Research Project



Project Title: Bacterial Sensing based on Biochip Fluoro-immunoassay

Project Researcher: Gabriel Nzulu

Funding Body: Beaufort Marine Research Awards

Project Summary: Microbial contamination is a global problem in marine and freshwater environments and there is an urgent need for robust, sensitive and selective monitoring devices that can be deployed as part of a remote multi-analyte sensor network. Optical fluorescence-based biosensors offer high sensitivity and selectivity and the sensor element can be incorporated in a miniature, disposable chip, which, in turn can be integrated with a multianalyte platform. A generic optical biosensor is proposed which will be based on a fluoro-immunoassay using diode laser or LED excitation and CCD detection. Antibodies for the specific bacterium e.g. E. coli, will be patterned on a planar plastic chip and the optical immunoassay will be carried out using fluorescently labelled antibodies in a sandwich assay configuration. The sensor can be used for a range of bacteria for which antibodies are available, and, as well as monitoring in marine and freshwater, can also be deployed in sea food processing for detection of food pathogens such as salmonella and listeria.

Key Outputs:

- Functioning demonstrator biochips for key environmental targets

Key Impacts:

- Importance of monitoring coastal and inland waterways towards compliance with EU Water Framework Directive
- Health and Safety benefits to society as effective monitoring will ensure cleaner and safer environment.
- Potential impact on improved food safety