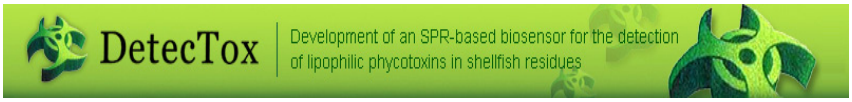

Aquainnova

www.eatip.eu

DETECTOX

Development of an SPR-based biosensor for the detection of lipophilic phycotoxins in shellfish residues

The Challenge

Toxic contamination is the main factor that determines the safety of shellfish and consequently the banning of shellfish production, which can cause serious economic damage to the shellfish industry.

Natural phycotoxins are biotoxins that are produced by naturally occurring marine phytoplankton. These substances can accumulate in aquatic animals that are used as food for human consumption and they are thermo resistant compounds; therefore normal cooking, freezing or smoking cannot destroy them. Paralytic shellfish phycotoxins affect the central nervous system of mammals and pose a threat to human health.

The four main types of shellfish toxins are:
• Paralytic shellfish poison (PSP),
• Amnesic shellfish poison (ASP),
• Neurotoxic shellfish poison (NSP), and
• Diarrhetic shellfish poison (DSP).

Lipophilic phycotoxins are often found in high levels in bivalve molluscs, echinoderms, tunicates or marine gastropods and the consumption of these contaminated seafoods can pose a significant threat to human health. There is a need to monitor levels of these toxins in seafood and keep levels below defined thresholds. In Europe the broad spectrum mouse or rat bioassay is the only official method for the detection of these toxins, although recently directives were approved stating that any functional method could be used to replace the bioassay if fully validated.

Project Objective

The over-arching objective of DETECTOX was to develop a multi-channel, high-throughput SPR-based biosensor for the detection of diarrheic shellfish toxins, yessotoxins, pectenotoxins, azaspiracids and gymnodimine. The sensor will be designed as an inhibition assay capable of multi-toxin detection.

Key Points

- Acquisition and purification of diarrheic shellfish toxins, yessotoxins, pectenotoxins, azaspiracids and gymnodimine, for use as reference standards in the calibration of the biosensor, and for immobilising on the sensor surface.
- Determination of the biochemical mode of action for azaspiracids and for gymnodimine.
- Production of polyclonal antibodies for each of the five types of toxin by immunisation of sheep, rabbits and mice. These will be used as binding molecules in the assay.

EATiP *Thematic Area of Relevance*

TA1: Product Quality, Consumer Safety and Health
TA2: Technology and Systems
TA3: Managing the Biological Lifecycle
TA4: Sustainable Feed Production
TA5: Integration with the Environment
TA6: Knowledge Management
TA7: Aquatic Animal Health and Welfare
TA8: Socio-Economics and Management

Key Words

Toxic Algal Blooms, Standardise identification, Monitoring, Shellfish Poisoning

Project Information

Contract number:
514055
Contract type:
Specific Targeted research Project
Duration:
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Funding:
€ 802.847 (EU contribution) of total 1.15 mio€
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www.detectox.org (site no longer hosted)

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- Production of the sensor chip and calibration of the biosensor using reference standards.
- Creation of an online database related traceability system for marine phycotoxins.

Output Highlights

The principal output of DETECTOX is a prototype DSP biosensor assay kit, as pictured here.

The Full Report:
For a description of the project, visit www.detectox.org

Next Steps – Suggested Actions/Follow On

Policy

- Validation of method is a legal requirement, and while the method is useful for screening, it cannot be further developed without EU validation. An SME is looking to commercially produce the testing kits.

Related Publications/Projects

BIOTOX