



## BIOTOX

**Development of cost-effective tools for risk management and traceability systems for marine biotoxins in seafood**

### The Challenge

Over the past decades, an increase in the frequency and diversity of toxic algal blooms has been observed. The algae are accumulated by most shellfish species and can negatively affect human health and cause serious financial loss to the aquaculture industry.

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).

There is a need for quick and accurate testing for the presence of biotoxins in shellfish. At present there is a lack of reliable analytical methods for the determination of toxins that cause DSP. The only 'officially' prescribed European method is the mouse bioassay, which is an animal unfriendly, broad-spectrum test that does not allow a proper quantification of the toxins. For this reason, the BIOTOX project focused on the analytical methods for the determination of marine lipophilic (lipid soluble) shellfish toxins that cause DSP.

### Project Objective

To standardize the identification for toxic blooms, to develop cost-effective identification tools and early warning systems. To reduce the risk to consumers by improving decontamination protocols and creating a standardised response to risk management across Europe.

### Key Points

- Development and validation of a confirmatory analytical method for the detection of lipophilic toxins in shellfish, and of robust, rapid and cost-effective assays that cover all lipophilic shellfish toxins mentioned in the EU legislation and to enable a phase out of all animal tests currently applied in this field.
- Development of advanced early warning tools for the detection of shellfish toxins in seawater and algae.
- Development of decontamination methods for toxic shellfish.
- Implementation of the developed methods in adequate HACCP control and verification of procedures in Europe for the monitoring, depuration and traceability of biotoxins, and advice on the harmonisation of these procedures in European Member states.



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### 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:**

514074

**Duration:**

39 months (01/01/2005-31/03/2008)

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**Project website:**

[www.biotox.org](http://www.biotox.org) (site no longer hosted)



## Output Highlights

- A review of “European Shellfish producing countries and EU Food Safety legislation on monitoring and control of Bivalves” was produced, including an overview of industry practice on shellfish toxin control by industry case studies. Recommendations were made to national and community authorities. These authorities should take the responsibility in mentoring FBO’s to help fill the gaps in scientific and technological knowledge
- New toxin identification methods developed will serve the shellfish industry and help to reduce monitoring costs
- Passive samplers developed during the project will allow the direct comparison with the toxins found in shellfish
- The detection and depuration methods developed during BIOTOX will be incorporated into Hazard Analysis Critical Control Point (HACCP) control and verification procedures in Europe for the standardised monitoring, depuration and traceability of biotoxins in shellfish
- The risk management practices of European Member States were harmonised to identify potential trade barriers and assist the industry in reaching its full commercial potential

Results from the BIOTOX project will help to ensure that European food is of consistently high quality and that the producers of shellfish can deliver a safer product.

### **The Full Report:**

For a description of the research project, visit [www.biotox.org](http://www.biotox.org)

## Next Steps – Suggested Actions/Follow On



### **RTD**

- Methodology using ultra high pressure liquid chromatography (UPLC) coupled to mass spectrometry (MS) allows for the separation and quantitative determination of a large array of lipophilic toxins, including all the lipophilic toxins regulated in Europe, and also effectively reduces matrix effects. However, neither method has been collaboratively validated and this still requires attention.