

# Occurence of biotoxins in mussels from different coastal locations and risk management in Chile (11<sup>th</sup> Region Aysen)

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The Biotoxins (Red Tide – Marea Roja) is an ecological and economic problem concerning aquaculture and tourisim in the coastal areas world wide. The neurotoxic, immunotoxic and genotoxic effects of domoic acid produced by the diatom *Pseudonitzschia multiseries* and saxitoxins (STX) paralytic shellfisch poisoning –PSP) produced by *Alexandrum catenella* and *Alexandrum ostenfeldii*. In addition the flagellate *Dinophysis acuta* produces the Diarrhetic Shellfish Poisoning (DSP). The need for increasing quality control at different critical steps of the food production chain has to be addressed by developing a set of rapid biomarker and sensor systems.

# Objectives Quality control of comercially relevant mussels for human consumption

## **Sampling Locations and Mussel species** Fjord of Aysen (11th Region of Chile)





Input (Nutrients - Pellets): Aquaculture of Salmo salar 109 kg N / t and 65 kg P / t produced

Fish

#### Effect related Risk Management:

Development of an effect related Ampel-System for mussel beds and comercial shellfish fishing in the Fjord of Aysen (see mapping and marks of yellow and red (no green) mussel bed In the Fjord of Aysen

**<u>Biotoxins</u>** as a result of the conflict between fishfarming and tourisms.

<u>Solutions:</u>

Mussel colonies
(*Diplodon chil*.) located
under the Fish Cages
(30-50% Reduction of
Phosphate = 300µ -> 3µ
Collectors of suspended

# <u>Commercially relevant</u> <u>mussels:</u>

CHORITO (Mytilus chilensis)

CHOLGA (Aulac omya ater)

ALMEJA (Protothaca thaca)

CULENGUE (Gari solida)

PICOROCOS, CHOROS, OSTRAS, Locos, Caracoles, Abalones



solids (funnels)

Biotoxines μg PSP / kg (PSP = paralytic shellfish poisining) soft body of the mussel species. WHO-Standard 800 μg/kg STX equiv.

Sampling-		
Stations	Mussel species	STX equiv.
		0 4 0 0
Colonia Chica,	Almeja	3409
Colonia Grande,	Almeja	1199
Isla Elena,	Almeja, Chorito	2794
Isla Churreque,	Almeja	2380
Canal Roudriguez	Almeja	1837
Cinco Hermanas	Almeja, Chorito	509



# **Poisonous Organisms:** *Dinopysis acuta*

Alexandrium catenella



Mussel bank stations

### **Bioanalytical System for Biotoxin Detection**







Flow cell with cryoconservated , membrane immobilized monolayers of hemocytes and detection of the phagocytosis activity by fluorescence of the digested particle linked biotoxins in the phagosome of the hemocytes. Dip stick with cryoconservated, membraneimmobilized monolayers of hemocytes for a semi static measurement.



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#### **References:**

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#### Acknowledgement:

The author greatfully acknowledge the European Commission; DG Reseach for funding the "Algaetox" project; the BMBF for funding the project "Regional-Planning in the Region Aysen Chile and Public Health Service of the Environmental Programme, Department "Red Tid Lab." in Aysen , Chile

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