EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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Cyanobacterial blooms and toxins in water resources: Occurrence, impacts and management.

Short Term Scientific Mission (STSM)

ATX genes in environmental samples and isolated strains: towards the identification of new producers

Researcher

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Short Biography:
- Master Degree at Stockholm University (2009-2011):

Title of thesis: Occurrence of cyanobacterial neurotoxin BMAA in blue mussels and oysters

- PhD student :(2011- Present): Fondazione E. Mach (N. Salmaso, L. Cerasino) and University of Konstanz (D. Dietrich).
Title of thesis: Diversity, impact and fate of cyanobacterial toxin in freshwater ecosystems

Host Organization

Prof. Kaarina Sivonen

Department of Food and Environmental Sciences. Division of Microbiology.
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Objectives

1) To detect the populations of cyanobacteria producing Anatoxin-a (ATX) in a deep, oligotrophic lake (Lake Garda, NE Italy)
2) To find out the main microcytin (MC) producers in this lake

Methodology

Sample collection. Environmental water samples are collected from Lake Garda at 3 different depths (0-2, 9-11 and 21 m) every month. The samples are filtered on GF/C filters and stored at -20°C.

DNA extraction. The DNA of environmental samples are isolated using a DNA Isolation Kit according to the manufacturer's instructions.

PCR. For the detection of the anaC-gene in environmental samples, the general primer pairs, anxgen and anaC-gen are used (Rantala-Ylinen et al., 2011, Appl. Environ. Microbiol., 77: 7271–7278).

qPCR : quantitative qPCR is used in order to detect the main toxin producer in Lake Garda

Results

The anaC-gene was detected in all the environmental samples by PCR. However, the amplification products were weaker from January to March and stronger in April and May. (Working on summer samples is under progress).

The result from qPCR also confirmed the PCR result; less ATX copy number was observed during winter season and the more in May at 9.5-11.5m (Fig.1). (Working on summer samples is under progress).

At present, I'm applying the methods I have learned in the host laboratory of Prof. Sivonen to the samples collected in Lake Garda since June 2013. When available, the results will allow 1) to identify the principal producers of ATX and MC; 2) to evaluate the seasonality and vertical distributions of cyanotoxins; and 3) to estimate the fraction of toxic genotypes as well as their temporal and vertical distribution (i.e. their variation in relation with the climatic and environmental fluctuations).

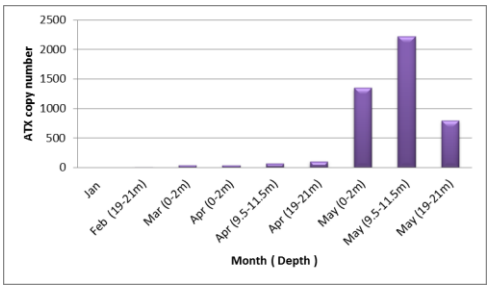

figure 1: ATX copy number at different depth, from January- May 2013

Study area for STSM ; Lake Garda

Highlights

I consider this Short Term Scientific Mission (STSM) as an important step in my research, because it provided the methods and background necessary to organize my scientific activity on this specific topic in the next two years.

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