



CYANOCOST – ES 1105 Action

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

www.cyanocost.com

Researcher



Katharina Makower

University of Potsdam, Germany -
Microbiology, group leader: Prof. Elke Dittmann

KM: born 04/10/1983 in Berlin, Germany;
Studies of biology at Humboldt University of Berlin; Start of PhD 2011 at University of Potsdam about heterogeneity and plasticity among *Microcystis* species

Host Organization

University of Amsterdam, Netherlands;
Aquatic Microbiology, group leader: Prof. Jef Huisman;

Supervision & Collaboration: Dr. J.C.P.(Hans) Matthijs, Dr. J.M. (Merijn) Schuurmans

Short Term Scientific Mission (STSM) *Microcystis* RNA Profiling

Objectives

The STSM at the University of Amsterdam aimed at getting new insights into transcriptional profiling of different cyanobacterial *Microcystis aeruginosa* strains. Especially, the reaction to external factors in *Microcystis*' environment, such as microcystin and other cyanobacterially produced compounds, and the potential implications in its ecological success were in focus. These experiments represent a major part of a PhD theses.

Methodology

An experimental design using microarrays for the comparison of transcriptional effects between different *Microcystis* strains, as well as between different environmental factors, e.g. microcystin was developed. While applying treatments of the strains and harvesting of the material was carried out in Potsdam, the professional experience of the University Amsterdam Microarray department helped with RNA-preparation & quality evaluation as well as further processing (microarray hybridisation) and data acquisition. As a key part in the conduction of microarray experiments, data analysis comprising statistical and bioinformatic techniques was an extensive part of the training acquired at the University of Amsterdam.

Results

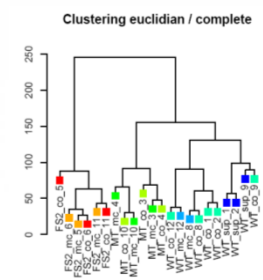
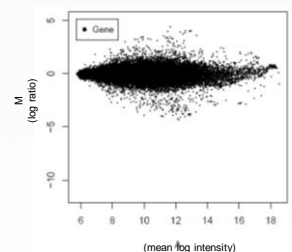
As a result of the STSM, a broad set of microarray data of good quality was obtained and its analysis started, especially concerning normalization and statistical evaluation of transcription levels. This has led to lists of differentially expressed genes. Up and down regulated genes are being clustered and will reveal metabolic pathways that are involved in the response to environmental factors like microcystin. The additional comparison between diverse *Microcystis* strains proved a strain specific range of reactions including the activation of distinctive gene clusters, which will add to the characterization of the *Microcystis* community. In this respect, a publication is planned focusing on the acquired microarray data, but cannot be named in more detail.

During the STSM overlapping interests concerning H₂O₂ stress and transcriptional analysis between me/ my home institute and the host institute in Amsterdam have led to further cooperation and projects together, which have been going on since.

Apart from the beneficial scientific exchange of the STSM in Amsterdam, getting to know other methods of operation in general in a very friendly, helpful, and interconnected atmosphere was quite inspiring. I and hope to stay in contact with people I have met and worked with.

Highlights

- conduction of good quality microarrays
- influence of external microcystin characterized as strain specific and connected to a few gene clusters
- identification of huge effects of field strain specific external factors
- a new collaboration concerning shared interests about H₂O₂ stress



COST is supported by the EU RTD Framework Programme



ESF provides the COST Office through a European Commission contract