

# CYANOCOST – ES 1105 Action

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

[www.cyanocost.com](http://www.cyanocost.com)

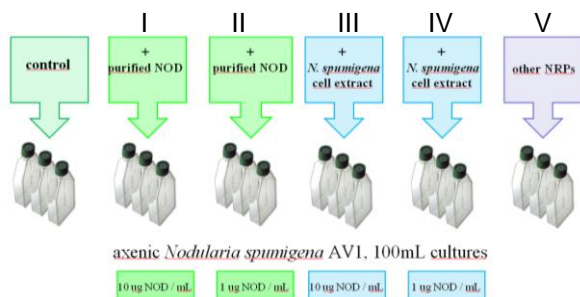
## Short Term Scientific Mission (STSM) Title: Autoregulation of nodularin biosynthesis in the cyanobacterium *Nodularia spumigena* ?

### Objectives

The purpose of the STSM project was to continue the studies on the regulation of the nodularin (NOD) biosynthesis in the the cyanobacterium *N. spumigena* using advanced molecular technique (RT-qPCR).

### Methodology

*N. spumigena* AV1 cultures were terated with the crude extract from *N. spumigena* cells or fractions which contained different nonribosomal peptides (NRPs) (Fig.1).



The growth of AV1 was measured using:  
- optical density  
- chl a concentration  
- protein content

Changes in NOD production were followed using:  
1. RT-qPCR  
ndaF - target gene  
16S rRNA – reference gene  
2. LC-MS/MS (MRM)

Fig.1 Experimental set-up

### Results

The experimental conditions, such as size of sample required for different analyses, sampling frequency and cultures inoculum, were tested and defined.

*N. spumigena* growth and NRPs concentrations in the cells and in the medium varied depending on the experimental variant.

Different tendency in the changes were observed for different NRPs analyzed in the work.

### Highlights

The preliminary results confirmed the previously formulated hypothesis that NRPs produced by *N. spumigena* cells may regulate the growth of the cyanobacterium and the biosynthesis of NRPs (Fig.2).

Many methodological problems in RT-qPCR analyses still should be resolved. Therefore, some further experiments have been undertaken to optimize RNA extraction and to design new primers.

### Researcher

Anna Toruńska  
University of Gdańsk  
Poland  
oceat@ug.edu.pl



Laboratory of Biochemical Ecology  
of Microorganisms

Group leader: prof. Hanna Mazur-Marzec

### Host Organization

University of Helsinki, Finland  
Department of Applied Chemistry  
and Microbiology  
Faculty of Agriculture and Forestry

### The Cyanobacteria Group

Group leader : prof. Kaarina Sivonen

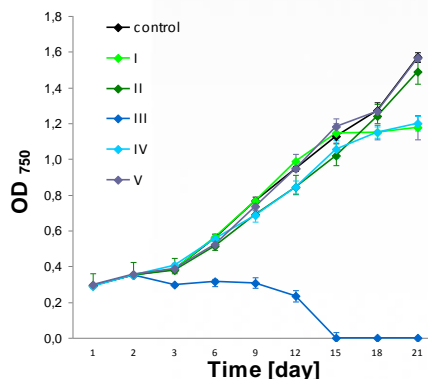


Fig. 2 Changes in OD<sub>750</sub> in different experimental variants



COST is supported  
by the EU RTD  
Framework Programme



ESF provides the COST  
Office through a European  
Commission contract