EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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CYANOCOST – ES 1105 Action

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

Short Term Scientific Mission (STSM)

Application of hydrogen peroxide in order to control the cyanobacterial blooming

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Objectives

Three experiments were done in this STSM.

1. Application of hydrogen peroxide on the water samples from **Lake Köyliönjärvi**.
2. Sample preparation and determination of microcystin concentrations in the **animal and plant tissues from Serbia.**
3. Identification and quantification of cyanotoxins in water samples taken from **Ludaš Lake** (Serbia).

Methodology

1. Köyliönjärvi experiment.

20 tanks with 1000 l of lake water per each tank were set next to Lake Köyliönjärvi. Than, hydrogen peroxide was added at different quantities, in order to achieve the desired concentrations in tanks: 0 mgL-1 (control), 2mgL-1, 5 mgL-1, 20 mgL-1. There were five replicates for each concentration. Samples were filtered trough Whatman GF/C 47 mm filters and analyzed to the presence of MCs and Chl a.

- **Extraction** of cyanotoxins and Chl a.
- **LC-MS/MS** (Liquid chromatography–tandem mass spectrometry) procedure for detection and quantification of toxins.

2. Experiment with tissue samples from Serbia.

Analyzed samples include:

- Fish tissues from **Mužlja fishpond** (fish muscles (M1, M2, M3, M4, M5, M6, M7, M8, M9, M10)).
- Fish tissues from **Ludaš lake** (fish tissues: liver (L1L, L2L), kidney (L1K, L2K), intestine (L1I, L2I), muscle (L1M, L2M), gonads (L1G, L2G), gills (L1Š,L2Š)).
- Fish from **lake near Jagodina** (whole fish (J1, J2)).
- Fish tissues from **lake Vrutci (Užice)** (whole fish (U1, U2), muscle (U3)).
- **plant** tissues (pepper- leaves (P L), fruit (PF)).

All samples were lyophilized. Two replicas of each sample was made. One column of samples was sprayed with cocktail of toxins.

-**Extraction** of cyanotoxins.

-**LC-MS/MS** procedure for detection and quantification of microcystins in all samples and their comparison.

3. Filters from Ludaš lake.

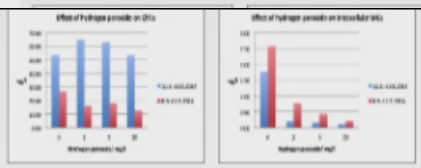
Filtration of 24 samples of water (12 samples of undiluted water (group I), and 12 samples of diluted water (5x dilution) (group II)) in 3 terms of observation (0h, 12h, 48h) (ie. total of 72 samples). Samples contained 0 mgL-1 (control), 2mgL-1, 5 mgL-1, 20 mgL-1 of hydrogen peroxide.

- **Extraction** of cyanotoxins.
- **LC-MS/MS** procedure for detection and quantification of toxins.

Results

1. **Köyliönjärvi experiment.** Reduction of microcystin concentrations has been observed, as well as selective effect of H_2O_2 on cyanobacterial cells.
2. **Experiment with tissue samples from Serbia.** Presented results include only tissues where toxins were detected.
3. **Ludaš lake experiment.** Influence of H_2O_2 on microcystin concentrations has been noted.

1.



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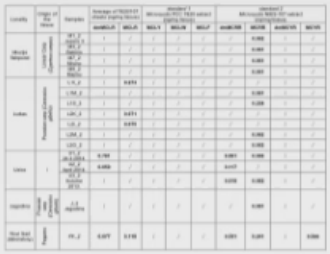

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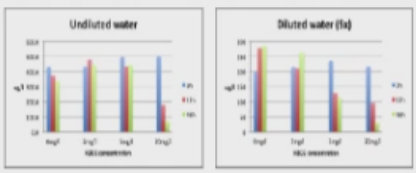

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