



ABSTRACT BOOK

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CYANOTOXIN PROFILING IN THE SUBALPINE DISTRICT LAKES

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Lakes in the subalpine district have been experiencing an increasing of cyanobacteria blooms in the last 20-30 years. We have performed a comparative survey over nine lakes located in the region (Garda, Maggiore, Como, Iseo, Lugano, Idro, Pusiano, Ledro and Levico) for assessing the cyanotoxin diversity and distribution. The considered lakes cover a wide range of trophic and physiographic characteristics. We employed LC-MS techniques for identification and quantitation of cyanotoxins. The study revealed the presence of cyanotoxins in the whole group of lakes. In particular, microcystins were present in all nine lakes. Although nine different microcystins variants have been identified overall, four on them were the most abundant, accounting for at least 94% of the total amount. The desmethyl-RR variant was the dominant form in all lakes with the exception of Levico Lake (where the YR form was dominant). In addition to desmethyl-RR and YR, LR and desmethyl-LR forms were the other most represented microcystins, although with much lower abundances. Moreover, it was found that the total microcystin concentration was positively correlated to the trophic status of the lakes. Among alkaloids, anatoxin-a was found in few cases (with the highest concentration of 2.3 µg/L registered in Lake Garda). The anatoxin-a concentration appeared to be independent from trophic status and strongly linked, instead, to the water temperature and to the size of the water body. Therefore anthropic and climatic factors seem to play different roles in the selection of different classes of cyanotoxins.

INFLUENCE OF CELL-FREE MEDIUM AND MICROCYSTIN CRUDE EXTRACT OF *MICROCYSTIS AERUGINOSA* ON THE GROWTH OF *ZEA MAYS* AND CHROMOSOMAL CHANGES IN *ALLIUM CEPA* ROOT TIPS

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This work aims to investigate the effect of exposure to cell-free medium and crude extract containing microcystin-LR of *Microcystis aeruginosa* on the germination stages and cytology of *Zea mays*. The results of this work confirm the toxic effect of both cell-free medium and crude microcystins of *M. aeruginosa* of log and death phase on *Zea mays* germination and chromosomal changes of *Allium cepa*. Soaking of *Z. mays* seeds for 24 hours in the cell-free medium during death phase of *M. aeruginosa* induced a significant reduction in root, shoot lengths, number of lateral roots, fresh and dry weights, leaf area and pigment contents after 8 days more than log phase. Cell-free medium showed high significant inhibition of mitotic index ($P < 0.001$) and inhibition was more pronounced in death phase than in log phase. In addition, chromosomal abnormalities were also detected in the root tips of *Allium cepa* treated with cell-free medium of *M. aeruginosa*. Soaking of *Z. mays* seeds for 24 hours in different concentrations of crude extracts of *M. aeruginosa* (100, 200, 300, 500 and 800 µg dry cells ml⁻¹) from log phase showed inhibitory effect of growth parameters, and no germination was detected with 800 µg dry cells ml⁻¹. The data obtained support the idea that the use of surface water containing cyanobacteria for crop irrigation can affect both plant yield and quality, and the accumulation of cyanobacterial toxins in edible plants might pose a potential risk for human and animal health, if the MC intake exceeded the recommended tolerable limits.