

Toxic potential of cyanobacteria in oligo-mesotrophic lakes: the case of Lake Garda (Italy)

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Some cyanobacteria genera are able to produce potent toxins, including hepatotoxins (microcystins, nodularins), neurotoxins (saxitoxins, anatoxins, BMAA), and cytotoxins (cylindrospermopsins). In the last decades, reports of cyanobacteria blooms have constantly increased worldwide and therefore the assessment of the toxic potential associated to those blooms has become a growing concern, considered the relevant negative impact of the presence of toxins on water quality and human health. Ongoing climate changes are mentioned among the factors favouring the occurrence of toxic blooms. In order to investigate the toxic potential of cyanobacteria in oligo-mesotrophic water basins, we have conducted a systematic survey in Lake Garda. *Planktothrix rubescens* and *Dolichospermum lemmermannii* are the most frequent potential toxic species in the lake. A monthly sampling campaign was conducted from 2009 till 2012; the molecular diversity of toxins was determined by liquid chromatography/mass spectrometry (LC/MS) techniques. Samples were screened for 14 microcystin variants, 3 anatoxins, and 3 cylindrospermopsins. Results show that the most abundant toxin was always the MC-RRdm, which is 4 times less potent than the most toxic MC-LR (LD₅₀ in mice are 12 and 50 µg kg⁻¹, respectively). Other four microcystin variants, MC-YR, LR, LRdm, and RR, were present but in very low amounts. Although the total microcystin concentration was always well below the safe level for humans (defined by the World Health Organization in 1 µg/l), microcystins were constantly present in all seasons with peaks in the summer months, in coincidence with the metalimnetic development of *Planktothrix* populations.