Evaluating the influence of light intensity in *mcy*A gene expression and microcystins production in toxic strains of *Planktothrix agardhii* and *Microcystis aeruginosa*

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Cyanobacteria are phytoplanktonic organisms widely occurring in freshwaters, being frequently associated with the production of toxins, especially microcystins (MCs). MCs are produced non-ribosomally by a multienzyme complex (*mcy* genes). It has been reported that environmental factors, such as light intensity, can influence toxin production. The aim of this study was to assess the influence of light intensity in the transcription of the *mcy*A gene and corresponding production of microcystins in toxic isolates of *Planktothrix agardhii*, where little is known, and compare them to *Microcystis aeruginosa*. For that purpose, cultures were exposed to three different light intensities for 18 days at 20 ± 1ºC. The growth was followed daily using absorbance readings. Samples were collected at each growth stage for cell counting, microcystins quantification and RNA extraction. The level of transcripts was quantified by RT-qPCR and the relative expression determined. Microcystin concentration per cell was similar between light intensities in *M. aeruginosa* and over time, while in *P. agardhii* it was higher in the stationary phase at 4 µmol photons m^{-2} s^{-1}. There were differences in the expression of *mcy*A between the two species. In *M. aeruginosa*, the highest levels of expression occurred at 4 µmol photons m^{-2} s^{-1} in the adaptation phase, whereas for *P. agardhii* it was at 4 µmol photons m^{-2} s^{-1} in the exponential growth phase. Comparing the temporal evolution of *mcy*A expression and the microcystins content per cell there seems to be an increase of *mcy*A expression levels which precedes the increase of the microcystins content per cell, in both species. This trend needs further confirmation, however it could help foresee the toxicity peaks in freshwater reservoirs, which would be preceded by a peak in *mcy*A transcripts.

Acknowledgements: This research was partially supported by the European Regional Development Fund (ERDF) through the COMPETE - Operational Competitiveness Program - and FCT -Foundation for Science and Technology national funds through Ph.D research grant SFRH/BD65706/2009 to C. Churro and Post-Doc research grant SFRH/BPD/75922/2011 to E. Valério.