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Abstract

Toxic Cyanobacteria Impacts on a Eutrophic and Protected Natural Ecosystem (Vela Lagoon) †

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Abstract: Toxic cyanobacteria naturally inhabit freshwater resources. The Vela Lagoon is a Natura 2000 protected site located near the Atlantic Ocean and in the central region of Portugal and has well-established recreational impacts. in recent years, the Vela Lagoon has been studied for the occurrence of cyanotoxins, and control studies have demonstrated that cylindrospermopsins were found on the water at maximum concentrations of 12 µg/L. Given these assessed impacts and the nature of this protected site, it becomes essential to review the impact of Vela Lagoon cyanotoxins within a longer period of time that includes 12 months between November 2016 and October 2017. The methods used include bloom occurrence and analysis on cyanotoxins, namely the microcystins variants LR, RR, and YR; cylindrospermopsins; anatoxin-a; and saxitoxins, by applying genomics and chemistry methods. The findings revealed that cylindrospermopsins are still a member of the cyanobacteria toxic community of the Vela Lagoon, that anatoxin-a was found to occur in trace amounts on the water fraction and bloom samples, and that microcystins-LR is the only variant found to occur in the Vela Lagoon. Given the two bloom episodes observed during the sampling season, control measures need to be readily implemented in the Vela Lagoon, since the impacts on the multiple cyanotoxins found can constitute a risk to humans who live near this protected site and frequently use this water for domestic irrigation. Finally, this study illustrates that toxic cyanobacteria can also impair water quality in sustainable environments.

Keywords: cylindrospermopsins; anatoxin-a; microcystins-LR; risk assessment

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