

Effects of Microcin SF608 and Microcystin-LR, Two Cyanobacterial Compounds Produced by *Microcystis* sp., on Aquatic Organisms

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Received 8 February 2002; revised 12 March 2002; accepted 9 April 2002

ABSTRACT: Effects of two cyanobacterial compounds, microcin SF608 and microcystin-LR, were investigated on different physiological parameters of two organisms, the water moss, *Vesicularia dubyana*, and the waterflea, *Daphnia magna*. Both compounds are produced by *Microcystis* species. Microcystin-LR is a potent inhibitor of protein phosphatases 1 and 2A, and microcin SF608 inhibits serine proteases. Other effects of microcystin-LR are well documented in the literature, but adverse effects of microcin SF608 have not been investigated as yet. This study compared the effects of both compounds on detoxication enzymes, microsomal and soluble glutathione-S-transferase (m-, sGST); oxygen stress enzymes, glutathione peroxidase (GP-X), and peroxidase (POD); photosynthetic oxygen production and chlorophyll *a*:chlorophyll *b* ratio. mGST was inhibited by both compounds in both organisms, significantly by microcin SF608, possibly indirectly by inhibition of that serine protease transforming the mGST to its active form. The sGST of *D. magna* was inhibited by microcin SF608, but elevated by microcystin-LR, and elevated by both compounds in *V. dubyana*. The GP-X in *D. magna* was not altered by microcin SF608, but elevated parallel to the sGST, whereas the POD in *V. dubyana* was decreased by both. Photosynthetic oxygen production as well as the chlorophyll *a/b* ratio showed typical stress reactions, a decrease of oxygen production, and an increase of chlorophyll *b*, caused both by microcin SF608 and by microcystin-LR. Microcin SF608 was not likely to be detoxified via conjugation to glutathione. The effects of microcin SF608 and microcystin-LR demonstrate that the impact of cyanobacteria on other organisms may not only be directly related to the presently known toxins. © 2002 Wiley Periodicals, Inc. *Environ Toxicol* 17: 400–406, 2002; Published online in Wiley InterScience (www.interscience.wiley.com). DOI 10.1002/tox.10065

Keywords: cyanotoxin; cyanobacterial compound; microcin SF608; microcystin-LR; glutathione S-transferase; glutathione peroxidase; peroxidase; photosynthesis; chlorophyll *a/b*