

IMPACT OF MICROCYSTIN CONTAINING DIETS ON PHYSIOLOGICAL PERFORMANCE OF NILE TILAPIA (*OREOCHROMIS NILOTICUS*) CONCERNING STRESS AND GROWTH

A. ZIKOVA^{1,2}, A. TRUBIROHA³, C. WIEGAND³, S. WUERTZ³, B. RENNERT³,
S. PFLUGMACHER³, R. KOPP^{1,2}, J. MARES¹, W. KLOAS³

¹Mendel University of Agriculture and Forestry, Brno, Czech Republic

²Centre for Cyanobacteria and their Toxins, Institute of Botany, The Academy of Sciences of the Czech Republic

³Leibniz-Institute of Freshwater Ecology & Inland Fisheries, Berlin, Germany

Cyanobacteria are known to be important primary producers in aquatic ecosystems and to contribute dramatically to phytoplankton blooms as a consequence of environmental pollution with nutrients. In addition, cyanobacteria blooms might be harmful because they produce several cyanotoxins such as microcystins (MC). Despite impact of MC on growth has been described in several fish species, investigations concerning physiological regulation of stress and growth by MC are scarce. Thus the aim of the study was to determine whether MC containing diets might impact the physiological performance of the omnivorous Nile tilapia (*Oreochromis niloticus*) targeting stress and growth parameters. Therefore 4 different diets were prepared based on a commercial diet: a) without supplementation as negative control, b) with the non-toxic cyanobacterium *Arthrospira* sp. at 20% (w/w) as second control, c) with 5 and d) 20% dried cyanobacteria mass containing MC and fed to female tilapia. Blood and tissue samples were taken after 1, 7, and 28 days. The stress hormone cortisol was analyzed from blood samples suggesting that MC containing diets caused only moderate stress. In addition, the effects of the different diets on growth were investigated by determining gene expression of hepatic insulin-like-growth-factor-1 (IGF-1). Semiquantitative RT-PCR demonstrated slightly inhibitory effects of MC on growth performance of tilapia, which was confirmed by classical growth data including growth rate and food conversion ratio. More detailed analyses concerning the impact of MC on the growth axis by assessing gene expression of hypophyseal growth hormone and of hepatic IGF-1 using real time RT-PCR are in progress.

Keywords: microcystin, fish diet, tilapia, physiological performance

Acknowledgements: The recent work was supported by DBU (Deutsche Bundesstiftung Umwelt) via a grant to A. Zikova and by the Czech National Agency for Agricultural Research QH71015.

Author for Correspondence: A. Zikova, e-mail: Andrea.Zikova@seznam.cz