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## **Bioaccumulation and effects of cyanotoxins in the aquatic environment**

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### **Abstract**

Massive development of toxic cyanobacterial bloom in freshwater is an unwanted consequence of nutrient pollution of aquatic ecosystems. Cyanobacterial blooms are common phenomena occurring worldwide in recreational and drinking water reservoirs or fish ponds including Czech Republic. Cyanobacterial toxins (cyanotoxins) belong among the problems connected with cyanobacteria. Their production negatively influences the organisms in aquatic as well as terrestrial ecosystem. The most studied and the most common group of cyanotoxins are hepatotoxic microcystins.

This work is focused on accumulation and elimination of microcystins in fish and birds and evaluation of oxidative stress and toxic effects of cyanobacterial biomass containing cyanotoxins. Results of our studies bring new information about kinetics of accumulation of microcystins in two ecologically different fish species and demonstrate concentrations of microcystins in individual fish organs such as muscle and hepatopancreas. Further, we have studied elimination of microcystins, and the results showed relatively fast elimination of microcystins from hepatopancreas and muscle of the fish.

This thesis also addressed the accumulation of microcystins and the influence of toxins on oxidative stress in birds. Accumulation of microcystins in the muscle and liver of birds was observed during feedings studies, and the impact of combined co-exposures of various stressors on final microcystin concentrations in the tissues were evaluated.

One of the chapters is also focused on the evaluation of the health risks for humans resulting from the consumption of food (edible fish muscle) contaminated with microcystins. The results from our experiments show relatively low risk. Specific part of the present work also studied the effects of cyanobacterial biomass on fish including the quality of the fish muscles. Interestingly, our studies showed only minor impact of cyanobacteria on the dietetic value of the fish meat.