

IDENTIFICATION OF TOXIC CYANOBACTERIA IN WATERBODIES OF THE BAIKAL REGION

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ВЫЯВЛЕНИЕ ТОКСИЧНЫХ ЦИАНОБАКТЕРИЙ В ВОДОЕМАХ БАЙКАЛЬСКОГО РЕГИОНА

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Cyanobacterial blooms in lakes and reservoirs and the corresponding deterioration of the water quality have become a serious problem for many countries. A survey of the presence of toxic cyanobacteria in the water bodies of the Baikal region (East Siberia, Russia) was carried out for five years (2005–2010). Phytoplankton samples were collected from Lake Baikal, Lake Kotokel, and three water reservoirs of East Siberia during the vegetation season. Potential microcystin- and saxitoxin-producing *Microcystis*, *Anabaena*, *Aphanizomenon*, *Gloeotrichia* and *Snowella* spp. were revealed in all of the studied water bodies. Specific primers for genes *mcyA*, *mcyE*, and *sxtA* that are responsible for microcystin (MC) and saxitoxin synthesis were used to genetically identify the presence of potentially toxic cyanobacteria. The genes *mcyA* and *mcyE* belonging to *Microcystis* and *Anabaena* spp. were found in samples from the littoral zone of Lake Baikal, in Lake Kotokel, and in the reservoirs Ust-Ilimsk and Bratsk. The gene of saxitoxin synthesis *sxtA* was detected in samples from Lake Baikal and the Ust-Ilimsk Reservoir. Microcystins and saxitoxins were detected by enzyme-linked immunosorbent assay (ELISA) in Lake Baikal and the Ust-Ilimsk Reservoir, and their presence was mainly assigned to the dominance of *Anabaena lemmermannii*. Three variants of microcystins were recorded in Lake Kotokel, where several episodes of the human poisoning were registered in 2008–2009. Microcystin concentration of 53 µg/g seston DW was recorded by liquid chromatography–mass spectrometry in a sample that contained *Microcystis* and *Anabaena* species. Ratios of three types of microcystins: MC-RR, MC-LR, and MC-YR found in Lake Kotokel were 49:42,5:8,5, respectively.

Thus, the study of cyanobacteria in major freshwater water bodies of East Siberia revealed the presence of toxin producing species. This can threaten the population of the Baikal region and needs further monitoring.

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