

FRESHWATER CYANOBACTERIA: A THREAT TO ECOSYSTEM STABILITY AND PUBLIC HEALTH

Vesna Karadžić, Jelena Knežević, Dragana Jovanović

Institute of public health of Serbia Dr Milan Jovanović Batut, Belgrade, Serbia

DOI: 10.5937/BatutPHCO24018K

Background: The abundant growth of cyanobacteria due to increased anthropogenic eutrophication and global climate change has created serious concerns about harmful bloom formation and contamination of surface waters worldwide, especially water sources used for drinking water supply. Cyanobacterial blooms followed by producing toxic compounds represent serious ecological consequences with a high risk for ecosystem stability and global public health. The absence or rare monitoring of freshwater cyanobacteria's presence (and abundance) and the lack of health risk assessment increases the threat to human health.

Methods and Objectives: This research aims to examine the condition of reservoirs for water supply in Serbia from the aspect of the presence of toxic cyanobacteria, cyanotoxins and human health risk assessment. According to the data of the Institute of Public Health of Serbia (IPHS), the supply of drinking water from public water systems that use reservoirs/lakes as their sources in Serbia (17 reservoirs) refers to the following cities: Valjevo, Bor, Zaječar, Priboj, Čajetina, Užice, Vrnjačka Banja, Belgrade, Kragujevac, Aranđelovac, Kruševac, Aleksinac, Vranje, Leskovac, Bojnik. The data from the IPHS cyanobacterial database referring to the period 2014-2024 were analysed.

Results: The results revealed that monitoring of cyanobacteria in drinking water supply reservoirs was not been performed regularly. Toxic cyanobacteria found most often in Serbian reservoirs that form blooms are: *Aphanizomenon flos-aquae*, *Microcystis aeruginosa*, *Planktothrix agardhii*, *Planktothrix rubescens*, *Dolichospermum planctonicum*, *Cuspidothrix issatschenkoi*. The investigated period faced us with an emergency caused by intense *P. rubescens* blooming in the Vrutci reservoir during winter period of 2013/2014, and also several managed blooms in two reservoirs: Čelije (July-September 2017) and Garaši (March 2016; February 2018). Analysis of cyanotoxins in drinking water were carried out during and after these blooms and showed values less than 1 µg/l total microcystins. In addition to the mentioned species, a large abundance of picocyanobacteria were recorded in the studied reservoirs, which also affect the ecological stability of aquatic ecosystems and some species are potential producers of cyanotoxins.

Conclusions: To assess and manage the risks of cyanobacteria to human health, it is important to understand their behaviour in natural aquatic ecosystems, as well as to know and understand the environmental conditions that support their excessive growth and development.

Keywords: cyanobacteria, cyanotoxin, reservoir, drinking water, public health