НАЦИОНАЛЕН ЦЕНТЪР ПО ОБЩЕСТВЕНО ЗДРАВЕ И АНАЛИЗИ
Изх. №: ..... 20 г.
Вх. №2166 07.05. 2026

OPINION

by Professor Dr. Ivanka Grigorova Dakova,
Faculty of Chemistry and Pharmacy at Sofia University „St. Kliment Ohridski",
a member of the Scientific Jury (order № RD 146/18.03.2026 of the Director of the National Center of Public Health and Analyses (NCPHA)

Regarding: Dissertation thesis for the award of the educational and scientific degree "Doctor" in professional field 7.1 Medicine, scientific specialty "Hygiene."
Author: Chief Assist. Prof. Mariya Angelova Mitreva, PhD, independent doctoral student
Dissertation title: „Hygienic and analytical aspects in the study of the seasonal dynamics of microcystins in surface waters intended for drinking purposes"
Scientific supervisor: Assoc. Prof. Vera Tsvetanova Pavlova, PhD

Chief Assist. Prof. M. Mitreva, PhD, completed her higher education at the Faculty of Chemistry and Pharmacy at Sofia University "St. Kliment Ohridski", earning a bachelor's degree in 2011 and a master's degree in Chemistry, with a specialization in "Medical and Pharmacological Biophysical Chemistry" in 2013. In 2017, she obtained the educational and scientific degree of Doctor (PhD) in Analytical Chemistry (4.2 Chemical Sciences). Since March 2017, she has been working at the National Center of Public Health and Analyses (NCPHA), initially as an Assistant, and since 2019 she has held the position of Chief Assistant Professor.

The presented doctoral dissertation entitled " Hygienic and analytical aspects in the study of the seasonal dynamics of microcystins in surface waters intended for drinking purposes " has been developed by Chief Assist. Prof. M. Mitreva, PhD – an independent doctoral student at the Directorate of Analytical and Laboratory Activities at the National Center of Public Health and Analyses (NCPHA). The doctoral student was discharged with the right to defense granted (Order No. RD-140/17.03.2026).

The dissertation of Chief Assist. Prof. Mitreva comprises 141 pages and includes 18 tables and 21 figures, with a total of 153 references cited. It is structured in accordance with the requirements for presenting scientific results and contains the following sections: Introduction, Literature Review, Aims and Objectives, Materials and Methods, Results and Discussion, Conclusions, Scientific Contributions, Appendices, and References. Lists of publications related to the dissertation and participation in scientific forums are also included.

The Introduction briefly presents the motivation for the conducted research, which is focused on assessing the risk of contamination and monitoring the seasonal dynamics of microcystins in surface waters intended for drinking purposes. The presented literature review demonstrates that the doctoral student is well acquainted with and critically analyzes the scientific literature on cyanotoxins, including their characteristics and methods for their determination. It also addresses the influence of environmental factors on toxin production and emphasizes the global nature of this problem, as well as its relevance to Bulgaria. Based on this, the main aim of the dissertation has been defined as follows: "Development, validation, and application of

analytical methods for the determination of microcystins in surface waters intended for drinking purposes, as well as characterization of the status of selected dams in the Sofia region and the surrounding area through the investigation of the content of these toxins and the assessment of the relationship between their release and environmental factors". Systematic investigations were conducted, and a chromatographic method for the determination of microcystins–RR, –YR, and –LR in water by HPLC was developed and validated (limit of quantification 0.2 μg/L, linear range from 0.2 to 1.5 μg/L, analytical recovery from 66.5% to 123.79%). The obtained results are discussed in detail, and conclusions are drawn regarding the presence and dynamics of microcystins in the Iskar, Studena, and Krasava dams. Concerning the relationship with environmental factors, it was established that no consistent linear relationship is observed between the concentrations of total nitrogen and total phosphorus and the content of microcystins. It has been suggested that the higher concentrations of microcystins observed during the autumn period are due to the release of intracellular toxins as a result of cyanobacterial biomass lysis following changes in hydrophysical conditions. A risk assessment has been performed, indicating that the Studena dam exhibits the highest potential for episodic toxin production, while the Iskar and Krasava dams demonstrate a more stable ecological status and a low toxicological risk. The obtained results confirm the need for dynamic seasonal monitoring of drinking water reservoirs, especially during periods of elevated temperatures and hydrophysical changes, in accordance with the requirements of European legislation. The obtained results and their interpretation constitute original scientific contributions of both a theoretical and applied nature.

Based on the obtained original results, several main contributions have been formulated in the dissertation, which can be summarized as follows:

• An analytical method titled "Water. Determination of microcystin content by HPLC" has been developed and validated, introduced as an internal laboratory testing procedure and included within the accreditation scope of the Health Research Centre at the National Center of Public Health and Analyses. The method can be used for monitoring the content of microcystin–LR in accordance with Directive (EU) 2020/2184 and Ordinance No. 9/2001 on the quality of water intended for drinking and domestic purposes.

• For the first time in Bulgaria, a systematic study has been conducted on the seasonal dynamics of microcystins and key nutrients in water bodies used for drinking water supply to the cities of Sofia, Pernik, and Breznik (the Iskar, Studena, and Krasava dams, respectively).

• The obtained results complement and build upon long-standing studies of cyanotoxins in dams in the Sofia region, expanding the database on the risk of toxin production in drinking water sources.

• The dissertation provides a scientific basis for the introduction of monitoring of microcystin–LR in accordance with the requirements of Directive (EU) 2020/2184, also including the accompanying homologues microcystin–YR and –RR for a more comprehensive risk assessment.

• The generated information can be used in the development of risk assessment programs and water quality management strategies for surface waters intended for drinking purposes.

The scientific contributions are clearly defined and accurately reflect the results obtained in accordance with the set objectives of the dissertation.

The results of the dissertation have been published in three articles, in which the doctoral candidate is the first author. They have also been presented at seven national and two international conferences. The first prize-winning poster, "Study of Seasonal Dynamics of Microcystins and Nutrients in Iskar dam" (presented at the 6th International Environmental Chemistry Congress, Trabzon, Turkey) confirms the relevance and high quality of the research topic developed by Chief Assist. Prof. Mitreva. It is also highly commendable that Chief Assist. Prof. Mitreva was the principal investigator of a successfully completed project funded by the Ministry of Education and Science, the results of which form the basis of the presented dissertation.

The presented dissertation and the accompanying materials are well prepared and leave an excellent impression. The abstract accurately reflects the main results and scientific contributions of the dissertation and has been prepared in accordance with the requirements.

I have no critical remarks or recommendations regarding the work of the doctoral candidate. I know Chief Assist. Prof. Maria Mitreva, PhD, as my colleague at the Faculty of Chemistry and Pharmacy and have an excellent impression of her correctness, precision, professional responsibility, and competence as a researcher. I know Chief Assist. Prof. Maria Mitreva, PhD, as my colleague at the Faculty of Chemistry and Pharmacy, and I have excellent impressions of her integrity, precision, professional responsibility, and competence as a researcher.

In conclusion, I consider that the dissertation of Chief Assist. Prof. Maria Angelova Mitreva, PhD, fully meets the requirements in terms of scope and quality and complies with all criteria set by the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, as well as the Regulations on the Terms and Conditions for Acquiring Scientific Degrees and Holding Academic Positions at the NCPHA. I strongly recommend that the esteemed scientific jury award Chief Assistant Maria Angelova Mitreva, PhD, the educational and scientific degree of "Doctor" in Professional Field 7.1 Medicine, scientific specialty "Hygiene."

Sofia

05.05.2026

Writing the opinion:

Заличено на основание
– на чл. 5, §1,б "в"
от Регламент (ЕС) 2016/679

Prof. Dr. Ivanka Dakova