

OPINION

by Assoc. Prof. Dr. Velyana Georgieva Georgieva,

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Member of the Scientific Jury according to Order No. 38-30/16.01.2024

Regarding the application of the academic position of "Associate Professor", announced in State Gazette, no. 104/15.12.2023, in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.2 Chemical Sciences, scientific specialty "Analytical Chemistry", for the needs of the Faculty of Chemistry and Pharmacy

The only candidate for the announced competition: Chief assistant professor Dr. Veronika Mihaylova

Biographical data

Chief assistant professor Dr. Veronika Mihaylova graduated in 2009 as a chemist in the specialty "Ecochemistry", Master's degree at Sofia University "St. Kliment Ohridski" with excellent success. After graduation she started working as a chemist in the Department of Analytical Chemistry at the University. At the same time she was able to prepare her PhD thesis on "Study of changes in the ionome of *Taraxacum officinale* under the influence of anthropogenic factors by ICP-MS" at SU, which she successfully defended in March 2013. A few months later she was appointed to the academic position of "Chief Assistant Professor" in the same department. In the period 2019 - 2023, she performed activities under the project BG05M2OP001-1.002-0019 as a researcher. At present, she leads lectures in the disciplines "Analytical Chemistry" and "Applied Statistics", as well as practical exercises in the disciplines "Analytical Chemistry", "Analytical Chemistry Part I and II", "Instrumental Methods of Analysis" and "Analytical Environmental Chemistry" to various specialties of the Bachelor and Master degree programmes at the Faculty of Chemistry and Pharmacy. Dr. Veronika Mihaylova has been a supervisor of a total of 5 students who have developed a diploma thesis on analytical topics.

Research activity and scientific contributions

The candidate Dr. Veronika Mihaylova has submitted a list of 27 articles, of which 26 have been published in journals with impact factor IF (Web of Science) and with SJR without IF (Scopus) and 1 in a Bulgarian journal without IF. Three of these publications have been included in her PhD thesis and 3 have not been declared in the competition. The report on participation in scientific forums shows her involvement in scientific forums with 21 poster presentations and 5 oral presentations.

21 scientific publications have been declared under the competition all indexed in the world famous databases Web of Science and Scopus and are in the professional field and scientific specialty of the competition procedure. They are related to: elemental analysis of samples from: natural sites, archaeological materials, potential medicinal products; optimization of the ICP-MS method for the determination of 69 elements using the RPa-parameter with application to different matrices; assessment of contamination risk, bioavailability and ecotoxicological effects using chemometric approaches. In 9 of the publications submitted to the competition, the candidate is the first author, in 3 she is second author, and in the remaining publications she is third and fourth

author, which is an indication of active participation in the conception, analysis and writing of all the papers.

The number of citations of the scientific publications included in the reference according to regulation requirement is 92. The high scientific value and significance of the candidate's publications can be assessed by the total number of citations - 96 and Hirsch index $h = 6$.

A reference according to regulation requirement for the necessary indicators of the candidate is attached as follows:

1. Group A indicators

- 1.1. Indicator *A1 PhD thesis* – defended thesis on " Study of changes in the ionome of *Taraxacum officinale* under the influence of anthropogenic factors by ICP-MS" in professional field 4.2 Chemical sciences, Diploma № SU-2013-24/15.04.2013 – **50 points**;

2. Group B indicators

- 2.1. Indicator *B4 Habilitation thesis - scientific publications, refereed and indexed in world-known databases with scientific information (Web of Science u Scopus)* – 6 publications are presented - 2 in quartile Q1 [2,5], 1 in quartile Q2 [6], 1 in quartile Q3 [3] and 2 in quartile Q4 [1,4] for the respective years of publication – **109 points**;

3. Group G indicators

- 3.1. Indicator *G7 Scientific publications, referenced and indexed in databases Web of Science and Scopus*– 15 publications are attached, respectively in quartiles: Q1 – [2,5,6,7,13,15], Q2 – [11,14], Q3 – [1,3,4,8,9] and Q4 – [10,12] – **289 points**;

4. Group D indicators

- 4.1. Indicator *D 11 Citations in scientific journals, monographs, collective volumes and patents, referenced and indexed in Web of Science u Scopus)* – a reference with 92 citations of the candidate's publications is submitted. – **184 points**;

5. Group J indicators

- 5.1. Indicator *J 21 h-index=6* – **60 points**;
- 5.2. Indicator *J 23 Number of defended graduates* – 5 students – **50 points**;
- 5.3. Indicator *J 25 Participation in scientific projects* – participation in 11 projects is declared – **55 points**.

Total for all groups indicators 797 points

It is evident from the detailed submitted reference that the candidate exceeds the minimum national requirements. According to the Recommended Criteria for Acquisition of Research Degrees and Academic Positions at Sofia University "St. Kliment Ohridski" has also been submitted the Habilitation Thesis for equating a monograph to the equivalent number of articles.

The candidate's scientific and applied contributions are presented in four thematic areas:

1. Development and application of inductively coupled plasma mass spectrometry for determination of elemental composition of environmental samples (water, sediments, plants and soils)

An ICP-MS method was applied for the simultaneous determination of a maximum number of elements including macroelements in waters by appropriate optimization of RPa -coefficients achieved using a dynamic reaction cell. The chemical composition of Bulgarian mineral and spring

water brands was characterized and so-called elemental "fingerprints" were introduced to distinguish between different samples. This optimised method has been developed and applied to the determination of macroelements in other natural matrices - sediments, soils, plants. A detailed assessment of the anthropogenic influence on the accumulation of potentially toxic elements in sediments has been made based on their chemical composition, calculated enrichment factors, geoaccumulation indices, applied ecotoxicity tests and statistical approaches. The extent of anthropogenic contamination around the Tsar Assen mine was assessed by establishing the elemental composition of plant and soil samples from the region. The bioavailability of potentially toxic elements in human organism was determined.

The main contributions in this field are published in the papers declared in the competition with numbers B1-5, B7, B8, B10, B17. The number of citations on the mentioned publications is 27, verifying the actuality of the conducted research.

2. Assessment of the impact of wastewater treatment plants (WWTP) on surrounding water bodies and determination of organic pollutants in water

A new flexible sampling methodology, a new way to assess the impact of WWTPs on receiving water bodies, and prioritization of water quality indicators responsible for WWTP impacts are proposed. This methodology is based on combining traditional chemical indicators with chemometric approaches and ecotoxicological tests. A chromatographic method for the determination of imidacloprid, cypermethrin and chlorpyrifos ethyl has been developed and validated for the investigation of priority organic contaminants in water.

The results of the research are reported in publications numbered B12, B14, B15, B16, B18, B19 and have gained 25 citations.

3. Archaeometric studies with mass spectral and X-ray methods

The chemical profile of gold finds and belt accessories was determined, based on which, after statistical processing, regional features, ethnicity and gender were established. This is the first time that a large-scale study of belt accessories from the time of the Migration of Peoples (3rd - 7th centuries AD) has been carried out in Bulgaria. One citation has been noted on the publications in this field (numbers B9, B11 and B20), probably due to the national importance of the research.

4. Development and application of inductively coupled plasma mass spectrometry in the analysis of anticancer platinum complexes

An ICP-MS method was developed, optimized and validated for the determination of trace Pt concentrations in different cell culture types and cell fractions. An important step in this analysis is sample preparation, requiring complete dilution of cell cultures, which necessitated optimization of its conduct. Accurate and reliable results of the above method were achieved by optimizing instrumental parameters and validation approaches by applying the standard additive method.

The main contributions in this field have been published in the papers declared in the competition under numbers B13 and B21. The number of citations noted on these publications is 2 as they were published in the period 2020-2023.

Teaching activities

During the period from 2013 to the present moment, Dr. Veronika Mihaylova has given lectures and practical classes in the Bachelor and Master Degree programmes in 6 disciplines. Five students have successfully defended their thesis under her supervision. It is evident from the submitted documents that Dr. Veronika Mihaylova has fulfilled the requirements for a full teaching load and has developed an active teaching activity. This gives me reason to believe that she possesses professional competence and good teaching skills, attracting students, PhD students and postgraduates for their participation in research and project activities.

Conclusion

The enclosed competition materials, the quality of the candidate's teaching and research activities fully comply with the national requirements and the Recommended Criteria for the Acquisition of Scientific Degrees and Academic Positions at Sofia University "St. Kl. Ohridski". The scientific contributions in the publications of the candidate and the professional competence give me grounds to confidently support the candidature of Dr. Veronika Mihaylova for the academic position of **Associate Professor** in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.2 Chemical Sciences, scientific specialty "*Analytical Chemistry*" at the Faculty of Chemistry and Pharmacy, Sofia University "St. Kl. Ohridski"

10.04.2024 г.

Member of the Scientific Jury:

/Assoc. Prof. Dr. Velyana Georgieva/