OPINION

by Assoc. Prof. Dr. Kiril Mihaylov Mishev (IPPG-BAS)

concerning the competition for the academic position of "Associate Professor" in the professional field 4.3. Biological Sciences, scientific specialty "Plant Physiology," for the needs of the "Experimental and Applied Algology" laboratory at IPPG-BAS, announced in issue No. 44 of the State Gazette dated May 19, 2023

1. General Information about the Candidate's Career and Thematic Development

In the current competition for the academic position of "Associate Professor" at the "Experimental and Applied Algology" laboratory at IPPG-BAS, documents have been submitted by a single candidate, Dr. Juliana Georgieva Ivanova. Currently, Dr. Ivanova holds the position of "Senior Assistant Professor" in the same laboratory. Shortly after completing her higher education at the Faculty of Biology at Sofia University "St. Kliment Ohridski," the candidate joined the scientific team at IPPG-BAS. During her career development, she progressed sequentially through the positions of "Biologist Specialist," "Assistant Professor," and "Senior Assistant Professor." At the end of 2006, J. Ivanova successfully defended her doctoral dissertation on her research in the field of physiology and biochemistry of microalgae and acquired the PhD degree the following year. From the provided autobiographical reference, it is not clear whether the candidate has completed specializations in the field of algology at other scientific institutions in Bulgaria and/or abroad during her long scientific career. Additionally, there is no mention of scientific collaborations with scholars and partner organizations in Bulgaria or abroad that are related to her thematic development and have contributed to achieving the experimental results described in the attached reference.

Based on Dr. J. Ivanova's publication activity over the past two decades, it can be concluded that her long-term scientific interests are related to the study of the physiology and biochemistry of microalgae and their biotechnological applications. The candidate has made a significant contribution to identifying and characterizing new extracellular polysaccharides with specific anti-tumor effects, antioxidant activity, and immune system-stimulating properties. Important biotechnological aspects of her research also include the creation of biosorbents using microalgae for the removal of heavy metals from the environment, as well as the development of a method for utilizing waste products from biogas production facilities to obtain valuable microalgal biomass.

2. Evaluation of the Submitted References for Compliance with the Requirements of Article 26, Paragraph 1 of the Law on the Development of Academic Staff in the Republic of Bulgaria and the Specific Requirements for the Position of "Associate Professor" as Reflected in the Regulations on Specific Conditions and Procedures for the Acquisition of Academic Degrees and Occupying Academic Positions at IPPG-BAS

The analysis of the information available in the Web of Science and Scopus databases, as well as the references and accompanying supporting materials provided by the candidate, allows me to conclude that Dr. Juliana Georgieva Ivanova's scientific activities meet the minimum requirements for holding the academic position of "Associate Professor" stipulated in the Law on the Development of Academic Staff in the Republic of Bulgaria and the Regulations of IPPG-BAS. The points awarded for each of the indicators А, В, Г, Д, and Е, as outlined in the author's reference, have been accurately calculated based on the criteria and conditions specified in Annex 1 of the IPPG-BAS Regulations.

It is worth noting the significant number of inaccuracies and incompleteness in the documents submitted by the candidate for evaluation. For example, in the reference regarding the fulfillment of minimum requirements, the total IF for articles from groups В and Г has been incorrectly calculated by summing SJR values together with JCR values; for article Г7_7 published in 2015, an IF for 2018 has been provided; for article Г7_1 published in 2023, an IF for 2023 has been presented, which does not yet exist, and so on. The list of noticed citations is incomplete, as it reflects only the citations of articles published by the candidate until 2016. For publication В4_3, no abstract is provided, and in its place, there is an abstract from another article by Dr. Juliana Ivanova from the same year in the same journal. It should be noted that the mentioned inaccuracies do not affect the calculation of points required within the current competition procedure.

3. Analysis of the Main Research Directions of the Candidate and the Most Important Results in Each of Them

From the submitted publications for the competition and the author's reference detailing contributions, it can be concluded that Dr. Juliana Georgieva Ivanova's scientific work focuses on the study of the biotechnological potential of microalgae. Her research aims to reduce environmental pollution, develop waste-free technologies, and explore microalgae as sources of biologically active substances with applications in medicine. The reference provided by the candidate, with a few exceptions, accurately summarizes the scientific achievements reflected in the published articles. When presenting the main results obtained, Dr. Ivanova specifically highlights the activities through which she has contributed to the jointly published scientific research.

One of the primary directions in Dr. Ivanova's work involves the cultivation of promising microalgal species in laboratory cultures. This includes optimizing growth conditions (composition of culture media, laboratory facilities for maintaining controlled environmental conditions). Protocols have been developed for cultivating selected strains of microalgae that yield high quantities of valuable metabolites with applications in medicine and various biotechnological processes. An interesting aspect of these studies with significant innovative potential is the strategy of immobilizing microalgal cells in various matrices, which ensures long-term preservation of strains, increases the production of target compounds (extracellular polysaccharides), or produces biosorbents for the removal of heavy metals from the environment. In recent years, Dr. Ivanova, in collaboration with scientists from the Institute of Microbiology at BAS, has also developed additional research related to the utilization of waste bio-sludge from biogas production facilities for the intensive cultivation of selected microalgal strains that produce valuable natural organic

compounds. These studies have led to the creation and registration of a utility model with the Bulgarian Patent Office. The invention is based on additional processing of the bio-sludge, resulting in a greater accumulation of microalgal biomass compared to cultivation in a standard nutrient medium.

A second key direction in Dr. Ivanova's work is the identification and analysis of the biological activity of microalgal metabolites with potential medical applications. This line of research has significant pharmacological potential, particularly in the treatment of cancer. A suppressive effect has been observed on the growth of tumor cells when exposed to extracellular polysaccharides isolated from red microalgal species, without affecting the viability of control non-tumor cell lines. The candidate's contribution to the research is related to optimizing culture conditions, as well as isolating and purifying polysaccharide fractions. The published results in this area do not clarify the mechanism of action of the tested compounds on cancer cells, but the description of phenotypic changes upon treatment with different doses and durations allows for the selection of promising polysaccharides and the strains that produce them for future analyses at the molecular level.

4. Relevance of the Candidate's Research Topic and its Significance for Science and Society

The relevance of the research topic related to the study of the physiology, biochemistry, and biotechnological applications of microalgae is evident in the context of the priority areas for research set forth in the National Strategy for the Development of Scientific Research in the Republic of Bulgaria 2017-2030. Specifically, the candidate's research activities fall into two of the priority directions of the strategy: "Health and Quality of Life. Prevention, Early Diagnosis, and Therapy, Green, Blue, and Eco-technologies, Biotechnologies, Eco-Food," as well as "Environmental Conservation. Ecological Monitoring. Resource Utilization and Bioresources. Purification and Zero-Waste Technologies." Dr. Ivanova's work has clear societal significance, as it is related to the development of new approaches in the treatment of socially significant diseases and the utilization of waste products from biogas production.

5. Organizational and Educational Activities

Although the candidate has not provided information about conducted educational activities in the documents for the current competition, in the period 2016-2017, Dr. Ivanova served as a scientific consultant to a doctoral student from IPPG-BAS under the Program for Supporting Young Scientists at BAS (project ДФНП-207). Her participation as a coordinator in three research projects funded by the National Science Fund (BNSF) demonstrates organizational experience in carrying out activities within the scientific team at IPPG-BAS for these projects.

6. Critical Remarks and Recommendations

The documents submitted for participation in the current competition do not provide exhaustive information about the candidate's scientific activities. The references contain numerous inaccuracies, which, although not critical for meeting the minimum requirements of the competition, do not correspond to Dr. Ivanova's high scientific achievements. The author's reference regarding contributions is prepared carelessly, containing numerous spelling errors, as

well as incorrect attribution of scientific articles to the respective research topics (e.g., Г7_3 and В4_5).

CONCLUSION

Based on the materials provided for review and the additional inquiries conducted, I believe that Dr. Juliana Georgieva Ivanova, as the sole candidate in the current competition, fully meets the regulatory requirements for acquiring the academic position of "Associate Professor" at IPPG-BAS. Her long-standing scientific research in the field of microalgal biology is relevant and of high societal importance. The results obtained so far provide a solid foundation for future work in promising directions, such as cancer therapy and the development of waste-free technologies. The candidate's research interests align perfectly with the topics being developed in the "Experimental and Applied Algology" laboratory at IPPG-BAS. Based on the aforementioned considerations, **I give a positive assessment and recommend the esteemed academic jury to support the election of Dr. Juliana Georgieva Ivanova for the academic position of "Associate Professor"** in Plant Physiology, in the professional field 4.3. Biological Sciences.

September 11, 2023 Signature:

(Kiril Mishev)