

STATEMENT

by Associate Professor Dr. Grigor Traykov Zehirov (Institute of Plant Physiology and Genetics, Bulgarian Academy of Sciences – IPPG-BAS) regarding the competition for the academic position of "Associate Professor" in professional field 4.3. Biological Sciences, scientific specialty "Genetics," for the needs of the laboratory "Regulators of Plant Growth and Development" at IPPG-BAS, announced in State Gazette, issue no. 24 from 21.03.2025.

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

In the current competition for the academic position of "Associate Professor" for the needs of the laboratory "Regulators of Plant Growth and Development," IPPG, documents were submitted by one candidate – Dr. Krasimira Nedyalkova Tasheva. To date, Dr. Tasheva holds the academic position of "Chief Assistant Professor" in the same laboratory.

The candidate completed her Master's degree at the Faculty of Biology of Sofia University "St. Kliment Ohridski" in 2000, in the specialty of Molecular Biology (with a specialization in Genetics). She began her scientific career in 2001 at the Institute of Genetics at BAS, holding the position of biological specialist. In 2011, she successfully defended her dissertation titled: "*In vitro* cultures of *Rhodiola rosea* L. – a study on possibilities for propagation and conservation of the species and for production of biologically active substances," and obtained the educational and scientific degree "Doctor" in the field of "Genetics," code 01.06.06. Since 2011, she has held the position of "Senior Assistant" at the Institute of Plant Physiology and Genetics, BAS.

The CV indicates that Senior Assistant Tasheva has completed short-term specializations in Trieste, Italy, participating in a course in bioinformatics ("Bioinformatics: Computer Methods in Molecular Biology") with a scholarship from the International Centre for Genetic Engineering and Biotechnology in 2010, as well as at the University of Oslo, Department of Molecular Biology, under a fellowship program of the European Economic Area Financial Mechanism in 2012.

The candidate has participated in 25 short-term courses in various fields. She is a member of the Union of Scientists in Bulgaria (USB), section "Plant Physiology and Biochemistry," and of the Federation of European Societies of Plant Biology (FESPB).

Dr. Tasheva's main scientific interests are presented in two areas of fundamental and applied significance:

1. Biotechnological approaches for the development of *in vitro* cultures of medicinal plants for modulating the synthesis of secondary metabolites and for the conservation of endangered species.
2. Studying the effectiveness of extracts from medicinal plants as potential therapeutic agents for socially significant diseases (oncological diseases and Alzheimer's disease).

Dr. Tasheva's project activity includes participation in 2 COST Actions, leadership of 2 projects funded by the National Science Fund (NSF), participation in 8 NSF-funded scientific projects, and in 6 scientific projects under various other organizations. She actively participates in various forums aimed at promoting science to the public, such as:

- Career Forum 2025, Sofia University
- "Modern Trends in Natural Sciences" – July 2023 Lecture Series
- "Science and Business 3" – 2023
- "European Researchers' Night" – 2023

Her scientific work is reflected in the publication of 42 scientific articles and participation in 2 review articles as book chapters. The record shows that 23 of her articles are indexed in Web of Science, with a total impact factor (IF) of 60.357. She has 374 citations in Scopus and an h-index of 6. She also serves as a reviewer for scientific articles in various journals.

2. Evaluation of Compliance with the Requirements for the Academic Position of "Associate Professor"

The submitted information by Senior Assistant Tasheva complies with the provisions of the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB) and the Regulations on the Conditions and Procedures for Obtaining Scientific Degrees and Holding Academic Positions at the Institute of Plant Physiology and Genetics – Bulgarian Academy of Sciences (IPPG-BAS). The minimum requirements for the academic position of “Associate Professor” have been fully met. The points listed in the author’s reference sheet for each indicator have been correctly calculated, and in some indicators, they are more than sufficient. The total number of scientometric points with which Dr. Tasheva participates in the competition is 885 (with a required minimum of 540), distributed as follows:

- Group A (dissertation for obtaining the PhD degree): 50 points
- Group B – total of 100 points (minimum required 100 points): includes 4 publications in Q1 journals (4 x 25 points)
- Group G includes 10 publications (Q1 – 5, Q2 – 1, Q3 – 3, Q4 – 1, 2 publications indexed in SJR without IF, and 1 included in a book chapter) totaling 237 points (required minimum – 220 points); in 7 of the publications, Dr. Tasheva is the first or corresponding author
- Group D (citations): 378 points from 189 citations in Scopus or Web of Science
- Group E (project leadership/participation, attracted funding): 120 points, with a required minimum of 70 points

A summarized analysis of Dr. Tasheva's scientometric indicators shows that she not only meets but exceeds the requirements for holding the academic position of “Associate Professor” at IPPG-BAS. With a required minimum of 540 points, Dr. Krasimira Tasheva enters the competition with 885 points.

3. Analysis of the Main Directions in the Candidate's Research Work and the Relevance of the Research Topics and Their Most Important Results

The scientific work of Dr. Tasheva is divided into two main directions:

Direction 1: Biotechnological approaches for the development of *in vitro* cultures of medicinal plants for modulating the synthesis of secondary metabolites and for the conservation of endangered species.

An effective micropropagation system was developed for *Sideritis scardica*, *Clinopodium vulgare*, and *Rhodiola rosea*. The phytochemical composition and antioxidant activity were determined. *In vitro* propagated *Sideritis scardica* plants were successfully acclimatized in an experimental field and showed higher polyphenol content and better antioxidant activity compared to plants cultivated *in situ*. Studies on the conservation and restoration of endangered populations of *Rhodiola rosea* revealed that three-year-old *in vitro* propagated plants cultivated in mountain experimental fields produce salidroside and rosavins (main components of the phenolic complex) in amounts exceeding the minimum pharmacopoeial standards. No phenotypic differences were found in regenerants grown *ex vitro* in adaptation rooms, greenhouses, and mountain conditions. Cytological analysis confirmed cytological identity with the wild type. The different *in vitro* and *ex vitro* cultivation systems provide new opportunities for the conservation of the endangered species *R. rosea* and for the accelerated synthesis of bioactive compounds. The effect of nutrient composition on secondary metabolite concentration in *R. rosea* callus cultures was also studied and confirmed.

Direction 2: Study of the effectiveness of extracts from medicinal plants as potential therapeutic agents for socially significant diseases (oncological diseases and Alzheimer's disease)

Sub-area 1: The potential of extracts from *Clinopodium vulgare*, *Sideritis scardica*, and *Salvia aethiopis* was studied for their effects on the proliferation and viability of human tumor cell lines – HeLa (cervical carcinoma), HT-29 (colorectal adenocarcinoma), MCF-7 (breast carcinoma), and Hep-G2 (hepatocellular carcinoma), as well as non-tumor mouse fibroblast cell lines (BALB/3T3). A reduction in proliferation and viability was observed in the treated cell lines, with a more pronounced effect noted for extracts from *in vitro* propagated plants.

Sub-area 2: The neuroprotective effects of extracts from *Marrubium vulgare*, *Clinopodium vulgare*, and *Sideritis scardica* were studied in the context of Alzheimer's disease. Extracts obtained from *in vitro* cultivated *S. scardica* and *C. vulgare* were shown to effectively reduce memory impairment in an experimental model, improving cognitive function and supporting monoaminergic activity. *S. scardica* had a favorable effect on spatial working memory, while *C. vulgare* showed better results for recognition memory, displaying strong antioxidant activity and acetylcholinesterase inhibition.

The research topics are highly relevant and have significant implications for the development of therapeutic strategies using natural products to treat or alleviate socially significant diseases. Given the lasting effects of climate change, there is a pressing need to develop biotechnological approaches for cultivating medicinal plants under controlled conditions without compromising the productivity of biologically active compounds. Such research plays an important role in preserving genetic diversity and in the sustainable conservation of endangered species.

4. Organizational and Educational Activities

Under the supervision of Dr. Tasheva, two students have successfully graduated with bachelor's and master's degrees from Sofia University. She also leads a specialized training course for postgraduate students at the Bulgarian Academy of Sciences Training Center titled "Plant Biotechnology."

Dr. Tasheva also contributes to the administrative work of the IPPG by participating in two institutional committees.

5. Critical Remarks and Recommendations

I have no critical remarks. I have several recommendations for the candidate. Regarding the search for natural products and their testing for the treatment of oncological diseases and Alzheimer's disease, Dr. Tasheva works in collaboration with other institutes, but there are no institutions directly related to medicine. I would recommend seeking contact with medical research groups, such as those at the Medical University, which could positively contribute to the goals of her research. *In vitro* cultivation of medicinal plants is a powerful tool for studying the direct role of various environmental factors (light, humidity, and other mild stress factors) on the accumulation of specific secondary metabolites. In her research, she has limited her work to testing various concentrations of certain phytohormones. A joint study with colleagues investigating the influence of factors such as light, drought, or different temperatures on the metabolism of plants grown under controlled conditions would be beneficial. Such groups exist both at IPPG and the Faculty of Biology at Sofia University.

6. CONCLUSION

Based on the materials provided for my review and the additional checks I believe that the thematic areas in which the candidate works are promising. The search for natural products to treat socially significant diseases will always be relevant. Optimizing the conditions for *in vitro*

cultivation of medicinal plants to enhance the production of bioactive compounds has practical and economic significance.

For these reasons, and following the analysis of the scientific indicators of Chief Assistant Professor Krasimira Tasheva, I consider her to be an established scientist in her field. Therefore, I will cast a "Positive" vote for her to be awarded the academic position of "Associate Professor" in the professional field 4.3. Biological Sciences (Genetics), for the needs of the laboratory "Regulators of Plant Growth and Development" at IPPG-BAS.

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Prepared by:

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