OPINION

by Prof. Dr. Velizar Kostadinov Gochev,
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on the materials submitted for participation in the competition for the academic position of **"associate professor"**

at the Stefan Angelov Institute of Microbiology at the Bulgarian Academy of Sciences in: field of higher education 4. Natural Sciences, Mathematics, and Informatics professional field 4.3 Biological Sciences (Microbiology – Mycology)

In the competition for "associate professor" announced in the State Gazette, No. 55 of 08.07.2025, and on the website of the Stefan Angelov Institute of Microbiology (IMicB) at the Bulgarian Academy of Sciences (BAS) for the needs of the Department of Mycology, Biodiversity and Molecular Biology of Micromycetes Laboratory, with Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva from the same laboratory as the only candidate.

1. A general presentation of the materials received

By Order No. I-113 of 04.08.2025 of the Director of the Institute of Microbiology (IMicB) - BAS, I was appointed as a member of the scientific jury in a competition for the academic position of "associate professor" at the IMicB - BAS in the field of higher education 4. Natural Sciences, Mathematics, and Informatics, professional field 4.3 Biological Sciences (Microbiology – Mycology), announced for the needs of the Department of Mycology, Laboratory of Biodiversity and Molecular Biology of Micromycetes. The only candidate who submitted documents for participation in the announced competition was Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva.

The set of materials in electronic form submitted by Senior Assistant Professor Dr. Zheni Georgieva Miteva – Staleva complies with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria (ZRASRB) and the Regulations on the Conditions and Procedures for Acquiring Scientific Degrees and Academic Positions at the Institute of Microbiology - BAS (Regulations-BAS).

The candidate, Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva, has submitted a total of 20 scientific papers, a list of citations and projects, as well as an official note certifying her work experience. All 20 scientific papers are accepted for review.

The type of documents allows me to determine that the procedure complies with the legal requirements.

2. Brief biographical information about the candidate.

Zheni Georgieva Miteva-Staleva graduated from the Faculty of Biology at Sofia University "St. Kliment Ohridski" with a master's degree in Ecology and Environmental Protection (2003) and obtained a PhD in Microbiology at the Institute of Microbiology and Biotechnology - Bulgarian Academy of Sciences (2017). The candidate began her career at the Institute of Microbiology at the Bulgarian Academy of Sciences, where she has held the position of microbiologist since 2005 and, since 2010, has successively held the academic positions of assistant and senior assistant.

The candidate's entire professional career, spanning more than 23 years at the date of submission of the competition documents, is related to the Department of Mycology, for whose needs the current competition has been announced.

3. General description of the candidate's activities

Assessment of the candidate's scientific activity

Group of indicators A: <u>Indicator 1</u> Dissertation for obtaining the degree of "Doctor"

The candidate holds a PhD in the scientific field of "Microbiology", obtained at the Institute of Microbiology - Bulgarian Academy of Sciences, after defending a dissertation on "*Low-temperature stress and cell aging in Antarctic* fungi," which generates **the 50 points** required by the indicator**.**

Group of indicators B (Sum of indicators 3 or 4).

The candidate participates with publications equivalent to a habilitation thesis.

<u>Indicator 4</u> Scientific publications in journals that are referenced and indexed in the global scientific information databases Scopus and Web of Science

Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva has fulfilled this indicator by submitting 6 publications, divided into the following categories: 2 publications in Q1 quartile journals; 2 publications in Q2 quartile journals and 2 publications in Q3 quartile journals. All publications focus on microfungi, with an emphasis on the production of enzymes by Antarctic fungi of the genus *Penicillium*.

By group of indicators ,Senior Assist. Prof. Dr. Zheni Georgieva Miteva-Staleva

generates a total of 120 points, which exceeds the threshold value of indicator B of 100 points, according to the ZRASRB and the Regulations of the Institute of Microbiology at the Bulgarian Academy of Sciences.

Group of indicators C (Sum of indicators 5 to 10)

To fulfill this indicator, Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva presents 14 publications in journals referenced and indexed in the global scientific information databases Scopus and Web of Science (Indicator G.7). The publications are distributed by category as follows: 2 publications in Q1 quartile journals; 4 publications in Q2 quartile journals, 5 publications in Q3 quartile journals, and 3 publications in Q4 quartile journals.

The candidate's scientific output clearly identifies the following research areas:

- ✓ Production of extracellular enzymes from microfungi isolated from specific ecological habitats and assessment of their biotechnological potential (publications 2, 4, 8, 9, 14, 15, 16, 20).
- ✓ Physiological and biochemical characterization of the cellular response of microfungi to stress factors in the environment, such as low temperatures, osmotic pressure, presence of toxicants, etc. (3, 10, 12, and 13).
- ✓ Antimycotic activity of natural biologically active substances and new composite materials (1, 5, 7, 17, 18, 19).

With regard to the first research area, the following significant results have been achieved: new microfungal producers of extracellular enzymes (catalase and sialidase) have been isolated and characterized, the conditions for the cultivation and production of enzymes from *Penicillium griseofulvum* and *Penicillium rubens* have been optimized, and laboratory schemes for the isolation and purification of temperature-sensitive enzymes have been developed. The results obtained serve as a foundation for developing effective biotechnologies to produce catalase and sialidase with specific properties and potential applications.

With regard to the second research area, the following significant results have been achieved: evidence has been obtained for the induction of antioxidant enzyme protection in fungi isolated from habitats with extreme living conditions in response to stress factors. The role of antioxidant enzymes such as CAT and SOD in adaptation to oxidative, salt (NaCl), and heavy metal stress has been established, which contributes to the elucidation of the

physiological mechanisms of fungi for survival in extreme habitats.

With regard to the third research area, the following significant results have been achieved: a method has been developed for the construction and application of chitosan-based nanoparticles and nanocomposites with a fungicidal effect against phytopathogenic fungi, with prospects for application in agriculture.

Analyzing the results reflected in the publications of Senior Assist. Prof. Dr. Zheni Georgieva Miteva- Staleva, scientific and applied scientific contributions of an original nature can be highlighted.

Scientific contributions of an original nature:

- ✓ New microfungal producers of sialidase and catalase have been isolated and species-identified from extreme habitats.
- ✓ Catalase genes involved in the antioxidant protection of Antarctic strains have been identified, and the role of *cat1*, encoding catalase-peroxidase in the *P. griseofulvum* strain, has been proven.
- ✓ The regulatory role of catabolic repression (CR) in the synthesis of sialidase and Cu/Zn- SOD has been demonstrated. For the first time, it has been established that CR regulates the synthesis of temperature-sensitive sialidase in the *P. griseofulvum* strain, regardless of the cultivation temperature.
- ✓ Temperature-sensitive sialidase and catalase have been isolated and characterized from the Antarctic filamentous fungi *P. griseofulvum* and *P. rubens*.
- ✓ The relationship between oxidative stress and aging in Antarctic microfungi has been demonstrated. For the first time, data have been obtained on the relationship between the growth phase of the culture and changes in the cellular response of strains from different temperature classes isolated from Antarctica.
- ✓ The physiological and molecular mechanisms of the antimycotic action of nanoparticles (NPs) and nanocomposites (NCs) based on chitosan (CS) and metal oxides (ZnO, CuO, **SiO_2)** have been proven**.**

Original scientific and applied contributions:

- ✓ A laboratory scheme for the isolation and purification of sialidase from *P. griseofulvum* has been developed.
- ✓ A method has been developed for obtaining and applying chitosan-based nanoparticles with fungicidal effect against phytopathogenic fungi, which have potential applications in agriculture.

All publications presented are thematically related and strictly focused on the field of the announced competition in the scientific specialty of Microbiology – Mycology. By indicator group G, Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva generates a total of 241 points, which exceeds the threshold value of indicator G of 220 points, according to the ZRASRB and the Regulations of the Institute of Microbiology at the Bulgarian Academy of Sciences.

Group of indicators D (Sum of points in indicator 11)

Indicator 11 Citations in scientific publications, monographs, collective volumes, and patents, referenced and indexed in world-renowned scientific information databases (Web of Science and Scopus)

To fulfill this indicator, Senior Assist. Prof. Dr. Zheni Georgieva Miteva-Staleva has submitted 198 citations in global databases (Web of Science and Scopus), which, according to the Regulations for the Implementation of the ZRASRB, generate a total of 396 points, exceeding the threshold value of indicator D of 60 points, according to the ZRASRB and the Regulations of the Institute of Microbiology at the Bulgarian Academy of Sciences.

The number of citations of the candidate for her entire scientific career is 198 in global databases (Web of Science and Scopus) and 84 in non-indexed publications, and her personal H-index is 9.

Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva has participated in 11 projects at the National Science Fund, 4 international projects, 2 national projects, 1 at Sofia University "St. Kliment Ohridski", Polar Scientific Research, and 10 commercial contracts.

4. Critical remarks and recommendations

I have no critical comments or recommendations regarding the candidate's scientific work and activities.

5. Personal impressions

I do not know the candidate personally and my impressions of her are based solely on the materials submitted for the competition, and my impressions are entirely positive.

CONCLUSION

The documents and materials submitted by Senior Assistant Professor Dr. Zheni

Georgieva Miteva - Staleva, meet all the formal and substantive requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of ZRASRB, and the relevant Regulations of the Institute of Microbiology at the Bulgarian Academy of Sciences.

The candidate in the competition has presented a sufficient number of scientific papers published after the materials used in the defense of the doctoral dissertation. The candidate's works contain original scientific and applied contributions that have received international recognition, a representative part of which have been published in journals referenced and indexed in the global scientific information databases Scopus and Web of Science.

The results achieved by Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva in her research activities fully comply with the minimum national and additional requirements of the Institute of Microbiology at the Bulgarian Academy of Sciences.

After reviewing the materials and scientific papers submitted in the competition and analyzing their significance and the scientific and applied contributions they contain, I find it reasonable to give my positive assessment and recommend that the Scientific Jury prepare a report proposal to the Scientific Council of the Institute of Microbiology "Stefan Angelov" at the Bulgarian Academy of Sciences for the election of Senior Assistant Professor Dr. Zheni Georgieva Miteva-Staleva to the academic position of "associate professor" in: field of higher education, 4. Natural Sciences, Mathematics, and Informatics, professional field 4.3 Biological Sciences (Microbiology – Mycology).

04.11. 2025 Opinion prepared by:

(*Prof. Dr. Velizar Gochev*)