O P I N I O N

by **Prof. Dr. Iskra Vitanova Ivanova** , SU "St. Kliment Ohridski" - Faculty of Biology

of the materials presented by **Zheni Georgieva Miteva –Steel** for participation in a competition for an academic position **„доцент“**at the Institute of Microbiology "Stefan Angelov" at the Bulgarian Academy of Sciences in the field of higher education **4. Natural Sciences, Mathematics and Informatics** ;

professional direction **4.3. Biological Sciences (Microbiology- Mycology)**

By order **No. I-113 of 04.08.2025 By the Director** of the Institute of Microbiology "Stefan Angelov" I have been appointed as a member of the scientific jury in a competition for the academic position of "Associate Professor" in the professional field 4.3 . Biological Sciences for the needs of the Laboratory of Biodiversity and Molecular Biology, Department of Mycology at the Institute of Mycology - Bulgarian Academy of Sciences.

In the competition for "associate professor", announced by the "Stefan Angelov" Institute of Microbiology at the Bulgarian Academy of Sciences in the State Gazette, issue 55 of 08.07.2025 for the needs of Laboratory of Biodiversity and Molecular Biology of Micromycetes , Department of Mycology at the Institute of Mycology - Bulgarian Academy of Sciences , as the only candidate participating is Senior Assistant Professor Dr. Assistant Professor Zheni Georgieva Miteva-Staleva.

1. General presentation of the received materials and assessment of the fulfillment of the minimum national requirements and the additional requirements of the Stefan Angelov Institute of Microbiology by the candidate in the competition for the academic position of "associate professor".

The materials presented by candidate Ch. Assistant Professor Zheni Georgieva Miteva-Staleva fully meet the requirements of the competition and cover the entire specific evidentiary part regarding the required criteria of the competition. They present the candidate's overall activity, both through lists of publications and citations, and through the text of the submitted contributions, the CV, etc. The submitted documentation is well arranged, including digital copies of the publications related to the participation in this competition, as well as their summaries in Bulgarian and English **.**

The presented scientific production includes 25 titles (20 articles in journals with IF and 5 in journals without IF), 1 chapter from a book and an abstract from a dissertation for obtaining the scientific degree "doctor " .

Compliance with the requirements of the ZRASRB Dr. Staleva has the following indicators :

- ✓ Indicator A: abstract for the ONS "doctor" - 50 points;
- ✓ Indicator C: 5 pcs. scientific articles (in journals with IF and quartile Q1 (2 articles), Q2 (2 articles) and Q3 (1 article) – 220 points
- ✓ Indicator D8 – 1 chapter from a book – 15 points;
- ✓ Indicator E: 198 citations (SCOPUS) without self-citations and 84 citations in other sources – 480 points.

Compliance with additional requirements of the IMikB shows that The candidate is a co-author of 20 articles after receiving the NOS "doctor" (required - 20), and in 5 articles she is the first author. The total number of citations is 480 (with required - 100). Impact factor for the entire scientific career 96.83 (required 20) and H-index-9 (required) 5) . Evidence is presented for 47 participations in Bulgarian and international forums.

The certificate of fulfillment of the minimum requirements for the academic position "associate professor" shows that the candidate meets and exceeds the required points. In addition, Dr. Staleva also exceeds the additional requirements of the Institute of Microbiology and Biochemistry-BAS. All of Dr. Staleva's works are collective, which meet both the minimum and additional requirements for the position of "associate professor".

2. Characteristics of scientific and publication activities .

The study of filamentous fungi is directly related to global challenges such as pathogenicity, biodegradation and biodeterioration. In addition, they represent a source of biologically active compounds with potential application in various sectors of industrial production . The presented scientific works include results of applied research in areas where filamentous fungi are poorly studied. The published works demonstrate research activity summarized in three directions:

A. Biodiversity and characterization of the biotechnological potential of filamentous

fungi isolated from habitats with extreme living conditions .

The results obtained provide new information about the diversity of fungi isolated from habitats with extreme environmental conditions and reveal their broad potential for the synthesis of industrially significant biomolecules with applications in the food, pharmaceutical and environmental industries (3, 4, 12, 13, 14, 16, 20, 21, 23).

B. Characterization of the cellular response of filamentous fungi isolated from habitats with extreme living conditions, against oxidative stress induced by various stressors .

Filamentous fungi are suitable model organisms for studying cellular mechanisms of adaptation to adverse environmental conditions. The role of antioxidant enzymes as a central component in the survival of fungal cells under stressful conditions has been experimentally established. The characterization of the cellular response is of great importance both for revealing fundamental adaptive mechanisms and for application in various areas, such as increasing the resistance of industrial strains or controlling pathogenic species. This knowledge can be used for the selection and development of resistant strains with potential for bioremediation and biotechnological applications (2, 3, 4, 5, 12, 13, 16, 20, 21, 23, 25).

C. Characterization of the antifungal and antioxidant activity of natural materials and plant extracts

The complex characterization of the antifungal and antioxidant properties of these natural resources and plant extracts creates a scientific basis for the development of new, effective and environmentally compatible bioproducts (1, 5, 7, 17, 18).

3. Evaluation of project activities

Dr. Staleva has participated in 28 research projects, 4 of which are international. The project participations are thematically related to the scientific areas of her research activity and correspond to the specialty of the current competition for the position of "associate professor".

4. Evaluation of scientific contributions

I acknowledge the contributions made in the relevant areas of her research activity, as follows:

- ✓ Low temperature stress induces the expression on specific catalase genes. The role of *cat1* , encoding catalase-peroxidase in a *Penicillium strain, has been demonstrated griseofulvum* .

- ✓ For first road is described, that CR regulates synthesis on temperature-sensitive sialidase in a strain isolated from Antarctica (*P. griseofulvum* P29), regardless of the cultivation temperature .
- ✓ For first road is received a purified preparation of a temperature-sensitive enzyme sialidase with a molecular mass of 39.9 kDa, which exhibits high specific activity at low temperatures and stability over a wide range of pH values.
- ✓ New information has been obtained regarding the relationship between protease activity and oxidative stress in Antarctic filamentous fungi. The dynamics have been characterized on synthesis on intracellular and extracellular proteases in the conditions on low-temperature shock and their participation in adaptive processes related to protection from oxidative disability on proteins .
- ✓ New strains of filamentous fungi with high resistance to salt stress have been identified, isolated from hypersaline extreme habitats .
- ✓ Established is significant correlation between the origin on the strains and their adaptation to extreme levels of NaCl. The obtained data emphasize the role of environmental factors in shaping resistance to hyperosmotic conditions .
- ✓ Proven is the role on the heavy ones metals in cellular answer to oxidative stress of strains tolerant to high concentrations of Cd, Cu, Ni and Zn. Changes in biomarkers of stress (carbonylated proteins, glycogen and trehalose) and antioxidant defense (SOD and CAT) were detected.
- ✓ The physiological and molecular mechanisms of antifungal action of nanoparticles (NPs) and nanocomposites (NCs) based on chitosan (CS) and metal oxides (ZnO , CuO , SiO_2 **) have been proven.**
- ✓ The development and application of a nanobiotechnological approach using chitosan-based nanoparticles with fungicidal effect against phytopathogenic fungi creates new prospects for sustainable agriculture .
- ✓ Isolated and identified are 65 the strain endophytic mushrooms, classified in 31 species from 11 phylogenetically distinct genera, which contributes to expanding knowledge about the mycobiome diversity of *L. aestivum* L. and the relationship between the composition of the endophytic mycoflora and the geographical distribution, as well as the organ-specific factors

influencing plant growth .

- ✓ Alkaloids as galantamine, epi-norgalantamine, lycorine, as well as various fractions (homolicorin, hemantamine, tazetine and skeletal type), exhibit strain-specific inhibitory activity against endophytic micromycetes, which highlights their potential as a source of natural fungicidal agents compounds.
- ✓ New information has been obtained regarding an extract of *Narcissus* cv. *Hawera containing Sceletium* -type alkaloids . This extract has been identified as the most effective with broad-spectrum and highly pronounced antifungal activity.
- ✓ *Amaryllidaceae alkaloids* in the regulation of plant-microbial interactions is presented , laying the foundation for future interdisciplinary research in the fields of chemical ecology, mycology, and plant physiology.
- ✓ The proven biocidal properties on chitosan nanoparticles and composites (CS-ZnO, CS-CuO, CS-SiO2) against the phytopathogenic fungi *Fusarium solani* and *Alternaria solani* create a prospect for the development of environmentally friendly biotechnological plant protection products

5. Assessment of the candidate's personal contribution

The documentation presented by Dr. Jenny Stalevaa, together with the attached scientific papers , the analysis of the obtained results, the interpretation and derivation of the main scientific and scientific-applied contributions - show her personal contribution to the experimental their development. The scientific works are collective, which is usual for a professional field of the competition, but the personal contribution of Dr. Staleva is clearly distinguishable, given her specialization in the indicated scientific fields and her position in the author team.

6. Critical remarks, recommendations and questions

I have no critical remarks or recommendations on the merits.

CONCLUSION

The documents and materials submitted by Senior Assistant Professor Dr. Zheni Staleva for participation in the competition for the academic position of "Associate Professor" <u>meet all requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria</u>

(ADRB), the Regulations on the Conditions and Procedure for Acquiring Scientific Degrees and Holding Academic Positions at the Bulgarian Academy of Sciences and that of the Institute of Microbiology at the Bulgarian Academy of Sciences .

The candidate in the competition has presented sufficient number of scientific papers with high scientometric indicators , as well as and convincing evidence of my scientific and applied scientific activities, which I evaluate entirely positively and highly.

I believe that Dr. Zheni Staleva fulfills and even significantly exceeds the requirements of the ZRASRB and the additional ones of the Institute of Microbiology for the academic position of "associate professor" .

Her works are of a contribution of scientific and applied significance. They have been appreciated by the international scientific community through the citations they have received.

All of the above allows me to confirm my positive assessment given by me in the analysis of her academic activity and I confidently recommend to the esteemed scientific jury, formed by order No. I -77 of 28.05. .2025. to the Director of the Institute of Microbiology at the Bulgarian Academy of Sciences and to the members of the National Board of Directors to evaluate the candidacy of Senior Assistant Professor Dr. Zheni Staleva and to vote positively for her to occupy the academic position of "Associate Professor" in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences (Microbiology-Mycology).

Sofia, 10.11.2025 Signature:………………………..