



EXPERT OPINION

By: Assoc. Prof. Dr. Trayana Spassova Nedeva, Faculty of Biology, Sofia University “St. Kliment Ohridski”, member of the scientific jury appointed by order No РД 38-612 / 15.12.2021 of the Rector of Sofia University “St. Kliment Ohridski”, Prof. Anastas Gerdjikov, Dr. Habil.

Re: The materials submitted for participation in a competition for the academic position Associate Professor of Sofia University “St. Kliment Ohridski” in Higher Education area 4. Natural sciences, mathematics and, informatics; Professional area 4.3. Biological sciences, Microbiology – General microbiology and biology of extremophilic microorganisms

The competition for the academic position Associate Professor in HE area 4. Natural sciences, mathematics and informatics, Professional area 4.3. Biological Sciences, Microbiology – General microbiology and biology of extremophilic microorganisms has been launched for the needs of the Department of General and Industrial Microbiology at the Faculty of Biology of Sofia University “St. Kliment Ohridski” in SG No 87/19.10.2021. Assist. Prof. Dr. ANNA ATANASOVA TOMOVA is the only applicant that has submitted documents for this competition within the deadline regulated by the law. She currently works in a permanent position in the same department.

1. General presentation of the procedure and the applicant

The documents for the competition are available online on the website of the Faculty of Biology, Sofia University (<http://biofac-unisofia.com/index.php/s/Ss9ftfoLxX4TSty>). They are prepared in compliance with the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, and the Regulations for the conditions and the order for acquiring scientific degrees and holding academic positions in Sofia University “St. Kl. Ohridski”. They also meet the recommended criteria for holding the academic position of Associate Professor in Professional area 4.3. Biological sciences. The documentation for the competition is well structured and allows the educational/pedagogical, scientific, applied/scientific, and administrative activity of the applicant to be followed in both quantitative and qualitative contexts.

Assist. Prof. Dr. Anna Tomova graduated from Sofia University "St. Kl. Ohridski", Faculty of Biology in 1999 and was awarded a Master degree in Molecular and Functional Biology, with specialization in Microbiology. She defended her PhD thesis “Characteristics of thermophilic aerobic spore-forming bacteria with carbohydrate degrading activities, isolated from Bulgarian thermal springs” in 2010 at the Stephan Angeloff Institute of Microbiology – BAS, where (in the laboratory of Extremophilic bacteria) she worked from 2001 to 2012. She continued her academic career at the Department of General and Industrial Microbiology, Faculty of Biology, Sofia University and, currently is holding the position of Chief Assistant Professor. During the period 2001-2009, she conducted two specializations abroad – in the biotech company Novozymes (Denmark) and CNR, Italy and performed research activities related to extremophilic bacteria investigation.

Assist. Prof. Dr. Anna Tomova has presented 28 papers as a scientific production. It has a total IF of 26.025, h-index 10, and is distributed as follows: a chapter in a book published by a foreign publishing house (co-authorship), 20 research papers in peer-reviewed and indexed journals, 3 oral presentations published in conference proceedings, 3 e-textbooks and a PhD thesis. According to Scopus/Web of Science research databases, the presented papers are cited 359 times, and in other databases - 206 times.

Eighteen publications are presented in the competition for the academic position of Associate Professor. Among them, a book published by a foreign publishing house (co-authorship), 17 research papers in international peer-reviewed and indexed journals, distributed by quartiles as follows: Q2 - 7 pcs. and Q3 - 10 pcs.; 3 e-textbooks. The reference in Scopus/Web of Science and other databases shows that these works were cited 121 and 206 times, respectively.

The results of the research activity were reported at 12 international and 8 national scientific forums with posters and oral presentations. Among them, 10 are presented for participation in the competition.

Assist. Prof. Dr. Anna Tomova took part in 18 research and educational projects (13 national and 5 international). They reflect her scientific, applied scientific and educational activity in the professional area of the competition.

2. General assessment of the applicant activity

2.1. Assessment of educational and pedagogical activity

The educational and pedagogical activities of Assist. Prof. Dr. Anna Tomova comprises lecturing and practical classes performance in Bachelor and Master degree programmes. On average, her total and auditorium workloads over the last 5 years are 536 and 412 hours, respectively. This activity includes the performance of lecture courses at the BSc programmes in Agrobiotechnology, Bio-management and sustainable development, Biotechnologies (2 compulsory and 1 elective course), and MSc programmes Microbiology and Microbiological Control and Food Quality and Safety (2 elective courses: "Biology of extremophilic microorganisms" that is performed for the first time during the current academic year and "Organoleptic analysis"). As regards the practical classes, Assist. Prof. Dr. Anna Tomova is conducting classes in 4 BSc disciplines and 8 MSc ones. She has developed the lecture material and the practical part of 2 courses (and the practical part of a third one) and is a co-author of training materials for the practical classes in 4 more courses (3 compulsory and one elective, in both educational and qualification degrees). Seven graduates have successfully defended their BSc and MSc thesis under her supervision (all of them during the competition period).

2.2. Assessment of scientific and applied scientific activities

Scientific papers

The reference for compliance with the minimal state requirements in accordance with Art. 2b of the Act for the Development of the Academic Staff in the Republic of Bulgaria for HE area 4. Natural Sciences, Mathematics and, Informatics, Professional area 4.3. Biological Sciences, indicates that the applicant research achievements fully fit the stipulated criteria, as follows:

- ✓ Indicators of group A: PhD thesis - **50 p.**
- ✓ Indicators of group C: C4 habilitation work - scientific publications in journals that are referenced and indexed in research database (Web of Science or Scopus) - **100 p.**
- ✓ Indicators of group D: research articles in international peer-reviewed and indexed journals - **205 т.** (minimum requirement 200 p.)
- ✓ Indicators of group E: cited papers – **448 p.** (minimum requirement 50 p.)

Scientific and applied research contribution

The applicant's contributions are focused on studying the biodiversity of microbial communities and identification of new biological species thereof; obtaining and biotechnological application of enzymes and exopolysaccharides of microbial origin isolated from extreme habitats; study of *Saccharomyces cerevisiae* yeast as a model system for studying the Go state of the cell cycle. These contributions can be grouped as achievements of scientific, applied scientific and methodical significance, as follows:

Major scientific contributions:

- ✓ Two new biological species from extreme habitats: the thermophilic Gram-positive bacterium *Anoxybacillus bogrovensis* sp. nov. and *Myroides guanonis* sp. nov., acknowledged by the *International Committee on Systematics of Prokaryotes* have been isolated.
- ✓ For the first time, in-depth study of the taxonomic affiliation and biological activity of 46 newly-isolated aerobic heterotrophic bacteria inhabiting the gallery with prehistoric drawings in the Magura cave have been performed.
- ✓ The lipid profile of two newly described bacterial species *Anoxybacillus bogrovensis* and *Anoxybacillus rupiensis* isolated from Bulgarian hot springs have been determined and characterized for taxonomic purposes.
- ✓ The extracellular thermostable enzymes inulinase, gellan lyase and lipase, produced by the thermophilic bacterial strains, belonging to g. *Bacillus* and g. *Geobacillus* have been isolated, purified and, characterized. Thermostable β -amylase and α -glucosidase from *Bacillus stearothermophilus*; extracellular collagenase of mesophilic *Streptomyces* sp. 3b strain; and an exopolysaccharide from the thermophilic species *Brevibacillus thermoruber* have been also isolated and characterized.
- ✓ The biodiversity of bacterial and archaeal communities of various extreme habitats in Bulgaria - hot springs and Magura cave, was examined by cultivation-independent molecular analyzes and metabolomic approach.
- ✓ The process of cellular differentiation in model *S. cerevisiae* cultures was studied and the role of the cell antioxidant enzymes for the entry and survival of Go cells and their adaptive response to oxidative and toxic stress was revealed.

Major applied research and methodological contributions:

- ✓ The potential of the isolated extremophilic (thermophilic and psychrophilic) bacteria as promising producers of enzymes and bioactive compounds was proven.
- ✓ The importance of the chemotaxonomic markers (lipid profile) for the classification of *Anoxybacillus* is confirmed.
- ✓ Effective approaches and schemes (both modified and original) for the isolation and purification of enzymes with practical application in industrial microbiology have been proposed. The use of these protocols results in final products with high yields and preserved biological activity.
- ✓ Combined approach for assessment of microbial populations biodiversity has been developed, using genes for defined metabolic reactions. This approach allowed the accumulation of information on the metabolic features of non-culturable microorganisms and their potential biotechnological applications as a new metabolic tank.

Contribution to academic education is the presentation of three educational materials, accessible in electronic form, for students and specialists in the field of modern microbial biotechnology.

2.3. Assessment of administrative activity

Assist. Prof. Dr. Anna Tomova is a secretary of MP “Microbiology and Microbiological Control” (2017 – at present) and a member of the Agribiotechnology working group of the Specialties’ Council (2018 – at present).

3. Assessment of the applicant's personal contributions

The presented by Assist. Prof. Dr. Anna Tomova research papers and accompanying documentation demonstrate a convincing personal contribution to the experimental development, analysis, interpretation and, publication of the scientific results.

The author's reference for the scientific contribution presents in details the scientific, applied scientific, and methodical achievements of the applicant. The successful integration of the knowledge and skills, acquired through the research activities, in the training process allows me to characterize the educational and pedagogical work of Assist. Prof. Dr. Anna Tomova as an innovative approach for amalgamation of science and education. I have known Dr. Tomova since her student time. As her former tutor and current colleague, I am convinced that she possesses all the professional qualities: scientific competence, teaching experience, excellent potential for teamwork and collegiality to hold the academic position "Associate Professor" of Sofia University "St. Kl. Ohridski ".

4. Critical remarks and recommendations

I have no remarks or recommendations to the presented materials and documentation, research and, teaching activity.

5. Conclusion

All formal requirements specified in the Act for the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, and the Regulations for the conditions and the order for acquiring scientific degrees and holding academic positions in Sofia University “St. Kl. Ohridski” have been fulfilled. Convincing and sufficient evidence for scientific, applied scientific, and educational/pedagogical activity of high quality are presented. The critical analysis of their significance allows me to confirm the positive assessment, presented above and to strongly recommend to the esteemed scientific jury, appointed by order No ПД 38-612 / 15.12.2021 of the Rector of Sofia University "St. Kl. Ohridski" to issue a report-proposal to the Faculty Council of the Faculty of Biology at Sofia University “St. Kl. Ohridski” for the election of Assist. Prof. Dr. ANNA ATANASOVA TOMOVA for the academic position Associate Professor in HE area 4. Natural sciences, mathematics and informatics, Professional area 4.3. Biological Sciences, Microbiology - General microbiology and biology of extremophilic microorganisms.

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Sofia

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