

REPORT

by

PROF. DR. NELI STOYANOVA KOSEVA

Member of the Academic Jury set to render a decision
on the competition for filling the academic position of a Professor in the Professional Field 4.3.
Biological Sciences (Microbiology), published in the State Gazette № 43/10 June 2022

This Report is prepared in response to Order № I-98/ 05.07.2022 issued by the Director of the
Stephan Angeloff Institute of Microbiology, Bulgarian Academy of Sciences, following the decision
made by the Academic Jury that was held on 28th August 2022

Assoc. Prof. Dr. Lyudmila Vladimirova Kabaivanova-Milanova is the candidate in the competition. She has submitted all the required documents according to the Regulations for the terms and conditions for acquiring scientific degrees and for holding academic positions at the Stefan Angelov Institute of Microbiology, BAS. According to the data from the professional biography, Assoc. Prof. Kabaivanova meets the requirements for occupying the academic position "professor" specified in Art. 29(1) of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and Art. 60 of the Rules for the Application of the Development of Academic Staff in the Republic of Bulgaria Act. The candidate acquired an educational and scientific degree "doctor" in 2007. She has held the academic position of "associate professor" at the Institute of Microbiology, BAS since 2011. Assoc. Prof. Kabaivanova participates in the competition with 21 scientific publications that have been published since 2012. The scientific works presented in the competition are different from those with which Dr. Kabaivanova participated in the competition for the academic position "Assoc. Prof." or for the acquisition of PhD degree. The candidate's scientific output meets the requirements of the Rules for the conditions and procedures for acquiring scientific degrees and for holding academic positions at the BAS, as well as those in the Rules of the Institute of Microbiology. In addition to the quantitative indicators B and D being covered, the high scientific level of the candidate's publications should be noted. The main part of the articles has been published in renowned journals such as Oxidation Communications, Polymers, Engineering in Life Sciences, Life, Int. J. Bioautomation, etc. The noticed citations of Prof. Kabaivanova's works are over 450, and of the publications in the competition - 100. The latter number corresponds to 200 points according to indicator D, i.e. significantly exceed the required minimum. In addition, the citations are an evidence for up-to-date thematic area and the significance of the obtained results. Assoc. Prof. Kabaivanova has an h index of 12, a total impact factor of 55.5, i.e. that these indicators also exceed the thresholds (h=10 and IF= 40, respectively) specified in the Rules of the Institute of Microbiology.

Assoc. Prof. Kabaivanova summarizes the research and the results obtained (the works with which she participates in the competition) in five areas related to the study of aerobic and anaerobic biodegradation processes with the aim of detoxification or assimilation of waste, use of bacteria and fungi to obtain composts, as well as production of new biologically active substances from bacteria and microalgae. I would take the liberty to assign the investigations to two important thematic areas based on their application

potential: ecological and biomedical fields. Both topics are not only relevant from the point of view of the modern tendencies of science development, but also indicated as priorities both in national strategic documents and at the European level.

Getting acquainted with the presented scientific output of Assoc. Prof. Kabaivanova, I would like to comment and highlight the following important aspects:

- fundamental nature of the research - the relationships are sought and dependencies between the activity of microorganisms and environmental factors that influence biotechnological processes have been found; basic characteristics such as mass transfer of substrates and products, activity of enzymes produced by microorganisms in biodegradation processes were determined, process models were developed for their management, cell-specific effect of newly isolated biologically active molecules from microalgae/bacteria was proven and etc.

- multi- and interdisciplinary nature of research – to increase the sustainability and effectiveness of microbial processes, approaches from the polymer science and material science have been applied, methods from biophysics/biochemistry and other related disciplines have been used to determine the mechanism of action of biologically active molecules, research has been carried out by teams with complementary competences. Some examples are the immobilization of *Aspergillus awamori* and *Porphyridium cruentum* cells in hybrid sol-gel matrices, the immobilization of *Pseudomonas aeruginosa*, *Bacillus cereus* and *Rhodococcus wratislawiensis* in cryogels, the isolation and study of the action of trehalose lipid, etc.

- innovativeness of research – new hybrid systems with the participation of microorganisms have been developed, processes are being studied and optimization is being sought for their application; new biologically active substances from bacteria and microalgae have been isolated; approaches and solutions for the utilization of waste have been combined with the production of energy from renewable sources; some of the studies have reached a high level of technological readiness to move to real conditions of application;

- perspective of the topic - this is evidenced not only by the international visibility of the research results, measured by the citation rate of the publications, but also by the multitude of projects the studies have been funded by. The potential for further development is also based on the problem-orientation of the applicant's research, as indicated in the next paragraph.

- research addresses socially significant problems: with the development of society, industrialization grows, which satisfies the growing needs for products and services. But this, in turn, leads to a tangible depletion of important natural resources, as well as the generation of huge amounts of waste. These problems have been becoming increasingly alarming with a strong impact on society, and have been identified as major challenges on a global scale. The evolutionary process has created the numerous empires of microorganisms that have a key place in the cycle of nature. Therefore, microbiological research can provide sustainable and intelligent solutions for overcoming the environmental problems, development of alternative approaches for biofuel and energy production, development of bio-agriculture, food and pharmaceutical industry. These are areas in which science and, in particular, microbiology has their established role and achievements, but the present shows that the concentration of scientific potential in microbiological

research is a key factor for solving the global challenges. I note with satisfaction that Assoc. Prof. Kabaivanova affirms readiness and ambition to conduct research in that thematic area, describing her future research plans.

I would like to summarize that Assoc. Prof. Kabaivanova is a leading scientist with a defined scientific profile. She actively participates in the entire range of activities related to research work and academic development:

- coordinator of 3 and participant in 13 more research projects, which have been financed by national and European programmes;
- international cooperation with scientific teams from Europe, as well as in the framework of scientific and technical cooperation between the Republic of Bulgaria and the People's Republic of China;
- participation at national and international scientific forums (69 presented communications);
- training of young researchers - (co)supervisor of three PhD students (one defended and two in the process of defense) and six graduate students, participation in the "Student Internships" programme;
- member of organizing and program committees of scientific forums and editorial boards.

In addition, Assoc. Prof. Kabaivanova has actively participated in the administrative, organizational and management activities of the institute in the capacity of scientific secretary, and presently deputy director, member of the Scientific Council of the Stefan Angelov Institute of Microbiology and representative in the General Assembly of BAS, Head of the "Applied Microbiology" Department until 2020, and presently of the "Biotechnology" Department.

I have no particular comments on the application documents. However, I would recommend when preparing documents related to competitions and career development, the candidate should outline more clearly the personal contribution to the results achieved. I wish Assoc. Prof. Kabaivanova more ambition and aspiration to publish in leading journals in the relevant field.

Conclusion: Assoc. Prof. Dr. Lyudmila Vladimirova Kabaivanova-Milanova fully meets the requirements for occupying the academic position of "Professor" according to the Development of Academic Staff in the Republic of Bulgaria Act and the specific conditions laid down in the Rules for the terms and conditions for acquiring scientific degrees and for occupying academic positions in the Stefan Angelov Institute of Microbiology, BAS. Based on the candidate's scientific output and competence with a defined thematic orientation, involvement in perspective and interdisciplinary research, as well as commitment to the development of the institute, I express a positive opinion and would like to recommend the members of the Scientific Council of the Stefan Angelov Institute of Microbiology to vote positively for the election of Assoc. Prof. Dr. Lyudmila Kabaivanova-Milanova to the academic position of "Professor".

16.10.2022

Report by:

Prof. Neli Koseva, PhD