

REPORT

prepared by **Prof. Margarita Kambourova, DSc,**
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regarding the materials submitted for participation in the competition
for the academic position of "**Associate Professor**"

Faculty of Biology, Plovdiv University "Paisii Hilendarski"

In the field of higher education 4. Natural sciences, mathematics and informatics
professional direction 4.3. Biological Sciences (Microbiology-Microbial Pathogenesis)

In the competition for "Associate Professor" for the needs of the Department of Biochemistry and Microbiology at the Faculty of Biology, announced in the State Gazette, no. 92 of 18.11.2022 and on the website of Plovdiv University "Paisii Hilendarski", **Mariana Ivanova Marhova-Koseva**, Assistant Professor in the Department of Biochemistry and Microbiology, Faculty of Biology (FB), Plovdiv University "Paisii" Hilendarski" (PU) has submitted her documents as an only candidate.

1. General presentation of the procedure and the candidate

I am included in the scientific jury for the selection of an "Associate Professor" in the field of higher education 4. Natural sciences, mathematics and informatics; professional direction 4.3. Biological sciences (Microbiology-Microbial pathogenesis) by an order No. PD-21-332 of 15.02.2023 of the Rector of PU. As a member of the scientific jury, I declare that we have no common papers with the candidate.

The set of materials presented by Dr. Marhova for participation in the announced competition is in accordance with the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) and its Regulations, as well as the Regulations for the Development of the Academic Staff of BF, PU. Dr. Marhova, has submitted a set of 35 publications, one monograph, one textbook and one manual, which are outside the dissertation for the educational and scientific degree "doctor". They are in the field of the competition and are accepted for review, four additional scientific papers presented on the dissertation are not reviewed. Among the indicated number of publications, 15 are in journals with Impact Factor/Impact Rank, 15 are in peer-reviewed journals without Impact Factor/Impact Rank and five are in proceedings from national or international conferences held in Bulgaria.

Dr. Marhova graduated as a master in biology and biology teacher with a second speciality in chemistry with excellent results from the course of education. She successfully defended her thesis for the scientific and educational degree "Doctor" at the Institute of Biochemistry and Physiology of the Academy of Sciences, USSR. She started working in the

FB, PU in 1991, and her entire further career for more than 31 years passed in this faculty through different stages of the scientific development (part-time Assistant, Assistant, Senior Assistant and Assistant Professor) being a teacher for almost 30 years. She has held the position of Assistant Professor for more than 25 years. I have no personal impressions of the candidate, but over the years I have followed her scientific activity.

2. General characteristics of the candidate activity

2.1. Assessment of educational and pedagogical activity

As can be seen from the reference presented by BF, she is an established teacher with an impact in the development of programs in 13 disciplines and with an exceptional busy academic horarium. In the five-year period alone, her classroom employment includes 2,804 hours of lectures and 1,732 hours of exercises in the impressive variety of disciplines - Microbial Genetics, Microbial Pathogenesis, Immunology, Cell Biology, Immunogenetics, Plasmids, Genetics of Industrial Microorganisms, Clinical Microbiology, Infection and Sterility, Biology of Infectious Diseases, etc. She teaches both bachelors and masters in various specialties - Molecular Biology, Medical Biology, Pharmaceutical Biotechnologies, Bioinformatics, Reproductive Biology, Genetics. Along with the courses, Dr. Marhova has supervised one PhD student and a big number of graduate students - 15 in the bachelor's program and eight in the master's program. Her creative attitude to the learning process is evidenced by her participation in the author's teams, which have written one textbook and one manual.

2.2. Evaluation of the candidate's scientific and scientific-applied activity

2.2.1. Requirements under ZRASRB

The candidate's indicators exceed those required by ZRASRB – while 400 points are required by the ZRASRB for all criteria, the total number of Dr. Marhova's points is 617. A habilitation work included in the indicator "B" according to the ZRASRB, is a monograph consisting of 164 pages. Among 15 publications with Impact Factor/SJR included in the list "D", two are in journals with Q2, five are with Q3, eight with Q4. Her works have been published in such prestigious international journals as Land and Journal of Basic Microbiology. Although most of the works have been implemented by large teams, Dr. Marhova is the first or second author in 11 papers and in one she is a corresponding author, which testifies to her serious contribution to scientific research. The number of citations found in Scopus (without self-citations of all authors) is 64, plus 2 different ones in WoS, thus the number of points collected for an indicator 11 is almost three times more than required. Among the noticed 66 citations, 63 are from foreign scientists and three from Bulgarians, without self-citation of all authors. The IF/SJR of the publications included in the competition for Associate Professor is 8.642, and the h-index is 6. Although there is no requirement for points in criterion "E", Dr. Marhova has collected 124 points from participation in eight projects, one of which is international and two are from

operational programs, the rest are national. She is a co-supervisor of a PhD thesis and co-author of a textbook and a manual.

2.2.2. Additional requirements for "Associate Professor" at the Faculty of Biology, PU

The candidate fulfills or re-fulfills all the specific requirements of BF, PU. She has a co-authorship in two teaching aids; while 5 graduate students are required, she has supervised 23 as well as one PhD student. Her teaching activity exceeds six fold the requirements of BF for only last five years, and the number of projects in which she participated is four fold greater than requested. In addition, Dr. Marhova actively includes in the administrative life of BF through her participation in: accreditation commission in professional field 4.3. Biological Sciences; commission for ensuring the quality of educational activity; attestation commission. She participates in the preparation and updating of the programs for study disciplines in the bachelor's and master's courses; quaestor in the student state examination; participant in the promotion of graduate students; participant in conducting school competitions.

2.2.3. Contributions (scientific, scientific-applied, applied)

Dr. Marhova's has concentrated her research activity in two areas in which she has achieved the main scientific, scientific-applied and applied contributions.

Microbial pathogenesis

Samples of patients with urogenital infections (UGI) have been analyzed for the first time in southern Bulgaria, incl. Plovdiv in the **monograph**, comprising a long period of 25 years. The author's contribution of Dr. Marhova was clearly differentiated. In my opinion the most important contributions presented in the monograph are:

- Scientific contribution is the establishment of the dominant etiological agents in the urogenital infections (UGI).
- A scientific-applied contribution is the establishment of more than one microbial species in a number of UGIs and the dependence of pathogenesis on the species composition, quantitative ratio and interspecies relationships.
- Applied contribution represents the conclusion in the need for coordinated actions of diagnostic laboratories and regulatory bodies to disclose data in order to reduce the empiric approach in the treatment of these infections.

Main impact reported in the **publications** concerns:

- Scientific contribution is the established interdependence between the expression of the virulence characteristics of the strains and their ability to form biofilm, type 1 pili and hemolysin.
- A scientific contribution is the establishment of a modulating effect of culture fluids from *Lactobacillus* spp. on the hydrophobicity, motility and biofilm formation in uropathogenic strains.
- The resistance observed in some strains to the action of complement in rabbit and human serum and the possibility for a change by a treatment of the plasmid content of the strains is of scientific and applied importance.

- An applied contribution is the identification of antibiotics, quinolone preparations and sulfonamides to which bacterial pathogens in UGI and *Candida* fungi are sensitive.

Microbial Ecology

Dr. Marhova's research in this field includes four main subfields: Study of the microbiological status and sanitary condition of several large Bulgarian dams in Southern Bulgaria; assessment of ecosystems in protected wetlands; optimization of microbial cultivation and enzyme synthesis for effective bioremediation and biotechnological processes; condition and qualities of soils in urban environments and creation of sustainable models for bioremediation. The main contributions in this field are:

- Scientific contribution is the identification of quantitative and qualitative changes in phytoplankton and bacterial communities in dams with developed cage aquaculture.
- A scientific-applied contribution is the possibility for successful development of biotechnological processes based on the established enzyme activities of a number of isolates, including alkaline phosphatase, phospholipase, lipase, protease and amylase.
- An applied contribution is the establishment of biological indicators for dam pollution by the increased urbanization.

3. Critical remarks and recommendations

I have no critical notes.

CONCLUSION

Based on the materials submitted for a participation in the competition for the scientific position "Associate Professor" at BF, PU and the analysis of their significance, I believe that the scientific-metric indicators of Dr. Marhova exceed the quantitative criteria for occupying this academic position laid down in ZRASRB and the Regulations to it, as well as the Additional requirements of BF, PU. She is an established scientist with international recognition, as evidenced by her peer-reviewed publications and their citations. The candidate has made a leading contribution in the field of the pathogenesis of urogenital infections and the ecology of microorganisms and microbial communities. Her scientific activity is accompanied by active teaching activity. On the basis of the above, I confidently support her candidacy and recommend to the scientific jury to propose to the Scientific Council of BF, PU "Paisii Hilendarski" to elect Dr. Marhova as an "Associate Professor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.3. Biological Sciences, specialty Microbiology-Microbial Pathogenesis.

March 31, 2023

Signature:

Prof. M. Kamburova, DSc