

## STATEMENT

from Assoc. prof. Zlatka Miltcheva Alexieva, PhD

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Regarding: Competition for obtaining the scientific title "ASSOCIATED PROFESSOR"

in scientific field 4. Natural sciences, professional direction 4. 3. Biological sciences

(Microbiology - Microbial pathogenesis)

announced in SG No. 92 of 18.11.2022 for the needs of

the University of Plovdiv " Paisiy Hilendarski "

In the announced competition for "Associate professor", the only candidate appeared was Dr. Marianna Ivanova Marhova - Koseva, in the position of ch. assistant professor at the Department of Biochemistry and Microbiology, Faculty of Biology, University of Plovdiv. The documentation submitted for participation in the competition is regular and prepared precisely in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, and the Regulations for its implementation, as well as the additional requirements of the Faculty of Biology in the UP.

Dr. Mariana Marhova competed for the position of associate professor and submitted 35 articles, two teaching aids, and a monograph titled "Drug resistance and virulence in uropathogens from Enterobacterales." The provided scientific papers have not been used to obtain prior academic posts or scientific degrees. She has actively participated in science as evidenced by the fact that she is the first author of six of the peer-reviewed articles and the second author of thirteen others.

The analysis of the data relating to the indicators under the National Minimum Requirements from the Regulations for the Application of the Law on the Development of the Academic Staff in the Republic of Bulgaria shows the following:

50 points are set for the possession of the PhD.

According to indicators from group B, 1 monograph is presented - 100 items.

According to the indicators from group G, within the framework of indicator 7, 15 of the publications are presented, which are in scientific journals, referenced and indexed in world-famous databases with scientific information according to the indicators of Regulations for the Application of the Law on the Development of the Academic Staff in the Republic of Bulgaria: 2 of them are with Q2; 5 - with Q3; and 8 - with Q4. According to this indicator, the sum of

points is 211. The total IF of the presented publications according to indicator D is equal to 7.605.

66 citations (without self-citations) are presented in the indicator for the citations of the publications in world-famous databases with scientific information (Web of Science and Scopus) or in total for indicators D the scored points become 132.

An error was made in the presented list of citations. Two of the citations (31 and 32) are from the so-called "hidden" self-citations, which reduces the number of citations to 64 and, accordingly, the amount under indicator D becomes 128 points.

The total of the points in the A through D category of indicators is 489.

A total of 124 points are awarded for the indicator group E, which includes the supervision of a doctorate student, the use of instructional aids, and involvement in research initiatives.

After the correction, the total points from the data entered in the Table for the minimum national requirements is 613, which is far higher than the minimum necessary 400 points.

**The conclusion is that Dr. Mariana Marhova fulfills the requirements for each of the presented groups of indicators, necessary for occupying the scientific position "Associate Professor" and, in general, scores significantly more than the sum of points from the mandatory national minimum.**

Regarding additional requirements:

Ch. Associate Professor Marhova has over 31 years of teaching experience at Plovdiv University "Paisiy Hilendarski", which shows that the candidate's academic career is entirely related to the institution and the main unit (Faculty of Biology - the Department of Biochemistry and Microbiology) that declared the need for a qualified person.

Dr. Marhova has participated in 8 research projects, 1 of which is international, and 2 are funded by the Scientific Research Fund at the Ministry of Education and Science. She was the academic supervisor of 23 graduates who successfully defended their diplomas (15 "Bachelors" and 8 "Masters"). She is the co-author of two teaching aids published by the Paisii Hilendarski University Publishing House: "Guide to Microbiology" and "Biological Membranes".

Materials proving her participation in the last 5 years in organizational and administrative activities, such as the procedure for accreditation of a professional direction, the Faculty Committee on Quality, the updating of a number of study programs in direction 4.3 Biological Sciences, the Faculty Committee on Attestation, etc., are presented.

**Regarding the fulfillment of the additional requirements of the BF, UP "Paisiy Hilendarski" for the development of the academic staff, it can also be noted that ch. assistant professor Mariana Marhova, PhD, fulfills all the criteria.**

### **Main scientific contributions of the candidate**

I consider it is important to note that the writing and publication of the book "Drug resistance and virulence in Enterobacterales uropathogens" is one of Dr. Marhova's greatest contributions. It demonstrates excellent worldwide and national expertise in the field of urogenital infections.

An extensive and fact-based overview of the achievements and unresolved issues in the fields of bacterial infections linked to biofilms, drug resistance and virulence in Enterobacterales uropathogens, and clinical use of both traditional and contemporary analytic methods. An important place in this work is also occupied by data from own research and other Bulgarian sources, which emphasize the aspiration of Bulgarian scientists to modernize and enhance various therapeutic procedures that are not adequately successful.

Monography can successfully serve both for teaching students and doctoral students and as an important information base for already-practicing specialists in the field of prevention and treatment of infections in the urogenital tract caused by pathogenic Enterobacterales.

In the candidate's documents, 14 main original scientific contributions are formulated, which are divided into two main areas: Microbial Pathogenesis - 9 and Ecology of Microorganisms - 5. They fully reflect the aspects of scientific activity of Dr. Marianna Marhova and fully correspond to those reported in published results.

I would highlight the following as the most significant of them:

- For the first time in Bulgaria, on the territory of Plovdiv, a 24-year study of the etiological structure of urogenital infections was conducted, and an etiological map of urinary tract infections in southern Bulgaria was created.

- Plasmid determined quinolone resistance has been proven.

- The significance of adhesive potential, biofilm formation, and serum resistance for bacterial adaptation in the urinary tract were valued.

- An experimental protocol was developed for the evaluation of serum resistance of Enterobacterales isolates, suitable for application in clinical practice in the diagnosis of IUT.

- For the first time in Bulgaria, the applicability of microbiological indicators has been proven, and a classification system has been developed for surveying the ecological status and

determining the water quality of economically important dams ("Kardzhali", "Batak", "Dospat", and "Tsankov Kamak").

- For the first time, a metagenomic analysis of 16S rRNA genes of the microbial communities in the "Batak" dam and the "Tsankov Kamak" dam was carried out. The obtained data contribute to a better systematic understanding of microbial diversity in freshwater environments.

- For the first time, the spatial differences, physiological diversity, and metabolic activity of soil microbial communities in natural wetlands and constructed rice paddies in the Maritsa river basin, protected according to Directive 2009/147/EC as natural habitats for birds, were studied.

### **Conclusion**

The scientific activity of Dr. Mariana Marhova fully complies with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its Implementation, as well as covering all the additional criteria required for holding the scientific position "Associate Professor" in the BF of UP "Paisiy Hilendarski". The elaborations presented by Dr. Marhova are appropriate, original, significant, and have a direct connection with the goals and development of contemporary microbiology.

In his experimental work, Dr. Marhova uses a rich arsenal of classical and modern analytical, microbiological, molecular genetic, and statistical methods. She has made significant contributions to research that advances infectious microbiology and clinical practice. The obtained results reveal opportunities and perspectives for new research and current problems in the field of microbial ecology affecting freshwater basins and adjacent wetlands.

Ch. assistant professor, Dr. Mariana Marhova, stands out as a thorough and active researcher in the field of microbial pathogenesis.

On the basis of the scientific contributions noted above, the overall documentation of the competition, and the undoubted qualities of the developments presented for the competition, I give a positive assessment of the participation of Dr. Mariana Marhova in the competition, and I strongly support and offer to the scientific jury and AC of UP "Paisiy Hilendarski" to vote for awarding the academic position of "Associate Professor" to CH assistant, Dr. Mariana Ivanova Marhova-Koseva.

10.04.2023

Prepared the statement:

(assoc. prof. Zlatka Alexieva)