# SCIENTIFIC OPINION

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**Subject: Evaluation of documents of a candidate, participant in a competition for the academic position "Associate Professor" for the needs of the Department of General Microbiology at The Stephan Angeloff Institute of Microbiology, BAS**

The competition was announced in State Gazette no. 29/12.04.2022, in professional field 4.3. Biological sciences (Microbiology - microbial biodegradation of toxic environmental pollutants), for the needs of the Laboratory of Microbial Genetics, Department of "General Microbiology", Institute of Microbiology, BAS. I am not a co-author of scientific publications with the candidate

## 1. Information about the candidate

The only candidate in the competition for associate professor is Dr. Maria Gerginova Gerginova, chief assistant in the Microbial Genetics Laboratory, part of the Department of General Microbiology, IMikB, BAS.

Maria Gerginova was born in 1970 in Sofia. He received his secondary education at the National High School of Natural Sciences, majoring in Biology, and completed his master's degree in 1993 at the Faculty of Biology of the University of St. Kliment Ohridski" majoring in "Biotechnological processes". He obtained the scientific and educational degree "Doctor" in microbiology in 2003 at the Institute of Microbiology on the topic: "Study of the process of phenolic biodegradation by yeast of the species Trichosporon cutaneum R57". Her internship in the specialty is over 28 years, part of which - in the "Biosynthesis of Organic Acids" section of the IMikB. Since 1996, he has been a research assistant, and since 2011, a chief assistant in the "Microbial Genetics" section of the same institute.

## 2. Fulfillment of the requirements for holding the academic position "Associate Professor"

The candidate has submitted references and lists of compliance with the criteria for the position, as well as supporting material. In the contest, Assistant Professor Maria Gerginova participated in 26 scientific works (18 publications in journals with IF/SJR, and 8 chapters in proceedings of international forums, published in full text). By groups of indicators according to the requirements of PPZRASRB and the corresponding number of points, the latter is distributed as follows. According to indicator A, the Author's abstract of PhD thesis is presented. According to indicator B, the candidate has presented 5 scientific publications in refereed journals (Scopus), one of which falls in quartile 1, three are in quartile 2 and one is in quartile 3. The sum of the scored points corresponds to the

required minimum of 100 according to the Law. According to indicator Г, 13 scientific works are presented (publications in refereed journals, 1 – Q1, 8 – Q2, 2 – Q3 and 2 - Q4), or a total of 239 points, which exceeds the required 200 points according to the PPZRASRB and 220 points according to the Regulations for the implementation of the ZRASRB for BAS. According to indicator D, Dr. Gerginova has presented 289 citations in WoS/Scopus, corresponding to 578 points with a required minimum of 100. According to indicator E, the candidate does not present evidence. In fact, Dr. Gerginova was the leader or participant in a total of 12 projects - of which 10 were national, 1 international and 1 - under the Operational Program "Science and Education for Intelligent Growth", co-financed by the European Union through the European Structural and Investment Funds. The candidate's indicators cover and exceed the inflated criteria of the IMikB: Dr. Gerginova has presented 26 scientific works (in addition to those for the "Doctor"-degree), 20 of which are required, and she is the first author of 7 of them (5 - required). Part of the works (18) are printed in refereed journals, and 8 are chapters of proceedings of international conferences, published in full text. The total IF of the publications is 23,454 (20 on requirement), and the candidate's Hirsch index is 9, on requirement - 5. The total number of publication citations is 289, and the candidate's total number of publications outside of those for ONS "Doctor" is 39.

**3. Scientific topics**

During the last twenty years, Dr. Gerginova has worked in the following scientific areas: (1) biodegradation of toxic chemical compounds by bacteria, yeasts, and filamentous fungi; (2) analysis of enzymes directly involved in the degradation of aromatic and polyaromatic compounds; (3) identification of microorganisms and detection and characterization of genes involved in the degradation of aromatic xenobiotics.In the direction related to the biodegradation of chemical pollutants, the candidate works both with the known *Trichosporon cutaneum* R57 and with promising new fungal strains isolated from Antarctica. The ability of yeasts and fungi to degrade hydroxylated monophenols (resorcinol, catechol, hydroquinone), methylated monophenols, and nitrophenols within a few hours was revealed. The degradation ability of yeasts towards naphthalene, anthracene, and phenanthrene was established for the first time, and particularly important achievement was the biodegradation of industrial pollutants from the oil refining industry such as dinitrophenol, α-methylstyrene and acetophenone. For the first time, a degradative activity was found for aromatic compounds of *Aspergillus glaucus* and *Alternaria maritima* species.

Some of the publications contain valuable models such as the Haldane-type model and the Fuzzy model for controlling biodegradation processes and the SKIP model predicting interactions in a mixture of toxic substrates.

Developing the other scientific directions related to the genetic analysis of the biodegradation qualities of the strains and the identification of new candidates with this potential, Dr. Gerginova applies and introduces new molecular biological methods. Thus, promising isolates of the genera *Dietzia, Arthrobacter, Rhodococcus* and *Gordonia* were identified from samples from Kazakhstan, and two of the strains were shown to use phenol as a sole carbon source. For the first time, genes encoding enzymes with phenol

hydroxylase and catechol-1,2-dioxygenase activity were sequenced in a representative of the *Aspergillus glaucus* species. Rapid genetic methods have been developed to identify the metabolic pathway of aromatic compound degradation in known and newly isolated microorganisms. Characterization of microbial consortia in fuel cells containing mining wastewater by metagenomics is a new and promising approach to bioremediation.

In her future research related to environmental cleanup and protection, the associate professor candidate envisages the continuation of current research, but also the development of new microbial sites and other toxic chemical pollutants, e.g. pesticides.

**4. Teaching**

Assistant Professor Maria Gerginova, Ph.D., is a consultant for two dissertations for PhD-degree.

**5. Participation in scientific meetings, membership in scientific organizations**

The candidate is a member of the Union of Scientists in Bulgaria, Microbiology Section. She participated in a large number of scientific forums abroad and in Bulgaria and presented the titles of 14 poster reports at international congresses and 15 in our country.

**6. Conclusion**

In conclusion, Maria Gerginova, Ph.D., is a scientist with indicators that exceed both the required minimum national requirements of the law on the development of the academic staff in the Republic of Bulgaria, and the additional increased criteria of the relevant documents of BAS and IMikB for occupying the academic position "Associate Professor" in the Professional direction 4.3. Biological Sciences. She has an excellent knowledge of the important and promising topics on which she works and has a sense of the significant problems in science, which will lead to many successful future developments. Based on the presented materials and analysis of the achievements, I give a completely POSITIVE assessment to the candidate and I strongly support the occupation of the academic position "Associate Professor" by Dr. Maria Gerginova Gerginova.

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Signature:

**На основание чл. 71 и 72 от ДОПК**

(Prof. Kaloyan Petrov, DSc)