

SCIENTIFIC STATEMENT

by **Prof. Dr. Elena Ivanova Georgieva**, IFRG - BAS, regarding a competition for the academic position "Professor" in the scientific field **4. Natural Sciences, Mathematics and Informatics**, professional field **4.3. Biological Sciences**, scientific specialty "General and Food Microbiology", announced for the needs of the Faculty of Biology, Sofia University "St. Kliment Ohridski", in SG, issue 88 of 13.10.2020

1. Common part

As the only candidate in the competition for the academic position "Professor" of General and Food Microbiology, announced for the needs of the Faculty of Biology, Sofia University "St. Kliment Ohridski" was Assoc. Prof. Dr. Petya Koycheva Hristova of OTD in the same faculty. The procedure for opening and announcing the competition has been followed and the documents have been prepared in accordance with the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation. All required documents are published at: <https://elearn.unisofia.bg/course/view.php?id=50250>.

Assoc. Prof. Hristova received her higher education in 1987. at the Faculty of Biology at Sofia University "St. Kliment Ohridski" and acquired the specialty "Molecular and Functional Biology", specialization "General and Industrial Microbiology". Dr. Hristova's scientific career began as a doctoral student at the same faculty, where after successfully defending her doctoral thesis: "Study of the collagenolytic activity of soil streptomycetes", in 1996, she acquired ONS "Doctor". In 2012, again after winning a competition, the Faculty of Biology gave Dr. Hristova the academic position of "Associate Professor". As a postdoc, Assoc. Prof. Hristova has held several specializations in prestigious world-famous scientific institutions such as: Department of Biotechnology, Robert Gordon University of Technology, Aberdeen / Scotland; the Biopolymers laboratories at INRA - Nantes and the Food Microbiology of ENITIAA - Nantes, as well as several TEMPUS and ERASMUS specializations in SigmoSantes, France, which help to establish her as an internationally recognized scientist.

2. Scientific production and scientometric data

The research of Assoc. Prof. Hristova so far for her overall scientific activity has been presented in a total of 65 scientific papers, with Impact Factor 30,712. The list of Dr. Hristova's publications included for participation in the competition for the academic position "Professor" is 22, of which: 1 Monograph; 14 Scientific articles in international peer-reviewed and indexed journals in Scopus; 5 in Scientific and educational publications in peer-reviewed journals without IF and SJR and 2 textbooks for student training. With posters and reports, some of the results were presented at 33 international and national conferences, 19 of which were included in the competition for "professor". The total number of citations in the databases for the period 1995-2020 is 529, of which related to the publications in the competition for "professor" for the period 2013- 2020 are 283 citations. Attached is a detailed reference of authors and publications that cited scientific papers generated by the "Authors" system.

According to the requirements for the implementation of the minimum national requirements under Art. 2b of ZRASRB for holding the academic position "professor", from

Table 1 of PPZRASRB on indicator B monograph Assoc. Prof. Dr. Hristova has 100 points; according to indicator D (publications outside the habilitation work) collects 207 points. at a required minimum of 100 points, and according to indicator D (cited) collects 566 tons. at a minimum of 100t. Thus, with a required minimum of a total of 350 points, according to PPZRASRB, Assoc. Prof. Hristova has 1143 points, which exceeds the minimum national requirements. Assoc. Prof. Hristova presents herself with high scientific activity and an indicator of this is the h-index amounting to 9 on the Scopus. It is obvious that Assoc. Prof. Dr. Hristova largely exceeds the scientometric indicators required for this academic position.

3. Scientific activity and contributions

From the beginning of her professional activity until now, the research activity of Assoc. Prof. Hristova is focused on solving scientific-applied and fundamental problems in the field of general and food microbiology. In thematic terms, her scientific activity covers a series of interconnected and complementary five main areas, which can generally be systematized as follows: 1- biological hazards in food; 2- antibiotic resistance to opportunistic pathogens; 3- molecular taxonomy of microorganisms; 4- preparation of biologically active substances with antimicrobial action and 5- microbiological control of probiotic products. Their results are thoroughly analyzed and end with a self-assessment of important contributions. The 22 scientific papers of the candidate presented for participation in this competition expand and upgrade the research in the field of molecular analyzes of microorganisms. They have developed and validated new diagnostic algorithms for taxonomic assessment of the structure and dynamics of microbial communities in food, explored important issues regarding food safety and quality and the role of microorganisms in this process. In each of these areas, the work of Assoc. Prof. Hristova demonstrates high professional competence, both in terms of research and in terms of transferring scientific results in an applied context. The research conducted by Assoc. Prof. Hristova is in full compliance with the priorities of the European programs for deepening our knowledge of biodiversity management and human health, genetic processes and our way of life. I accept and approve the report presented by Assoc. Prof. Hristova on the scientific contributions and the manner of their presentation, most of which are pioneering and of an original nature.

I cannot but express my excellent impressions of the monographic work of Assoc. Prof. Hristova, written in extremely clear and precise scientific language, accessible not only to professionals in the field of science, students, but also to the most ordinary reader. In this truly vast scientific work, she makes an in-depth analysis of the data published so far on the molecular mechanisms for cross-pathogenicity, the establishment of specific gene profiles and microbial structures of cross-pathogens associated with plant colonization. In this first-of-its-kind scientific study, Dr. Hristova proves the existence of a common plan for the infectious process and a common immune response in the cross kingdoms. A fundamental theoretical contribution to the work is to clarify the preconditions for the emergence of new cross-pathogens and to create evolutionary models that would explain the emergence of new relationships that increase the practical contributions of development. This first introduction to the multidisciplinary arena of cross-pathogens on plants raises the environmental awareness of our society and proposes to develop a mechanism for developing multidisciplinary proposals aimed at creating new strategies to minimize the risk of microbial contamination in food.

Proof of the productive academic development of Assoc. Prof. Hristova with personal contribution and indisputable leading role in scientific research are the many important scientific contributions in the field of general and food microbiology. Precisely and in perspective, her scientific achievements have led to one-of-a-kind new and original contributions. Such an original contribution with scientific-theoretical and applied character is the isolation for the first time from rye leaven in Bulgaria of lactic acid bacteria of the *Lactobacillus* species, as well as monitoring the dynamics of development of the lactic acid population in the fermentation process. The isolation of the lactic acid component from snails is the first study of its kind for this group of organisms. An important contribution to the practical and applied application of this study is the application of a combined approach to the establishment of the biodiversity of the lactic acid microbiota. By PCR amplification of 16S-23S ITS regions, lactic acid microflora isolates were typed to genus. In research related to the identification of phytopathogenic bacteria, Assoc. Prof. Hristova has created a new diagnostic algorithm for rapid identification of phytopathogens in order to track the ways of their penetration in Bulgaria, as well as in Northern Macedonia. The molecular amplification algorithm of 16S-23S ITS rDNA PCR, followed by RFLP analysis to identify the causes of bacterial scab was validated on 262 Bulgarian and Macedonian strains.

Remarkable, numerous and important are also the scientific contributions of Dr. Hristova on microbiological control of probiotic products and their beneficial effects on human health, as well as the evidence for obtaining biologically active substances with functional antibacterial properties that can be used as a substitute for some commonly used antibiotics. Last but not least, the contributions of Assoc. Prof. Hristova to academic education should be noted. For the competition she has presented two extremely useful textbooks: on "Microbiology" and "Pathogenic microorganisms", for students of all biological specialties and for microbiologists, biochemists, geneticists, biophysicists, soil scientists, etc., which are an important part not only in the training of students, but also support the work of teachers and research teams. The textbook on Pathogenic Microorganisms examines for the first time the role of microorganisms in the infectious process, as well as the mechanisms of action of the main groups of toxins and the factors of pathogenicity and virulence of selected, most common human pathogens.

4. Participation in scientific projects and other activities of the candidate

According to the information provided by the "Authors", for the period 2014-2020 Assoc. Prof. Hristova has participated in 32 research projects as a member and / or supervisor. For participation in the competition for "Associate Professor" she presented herself with 20 projects. In the current competition for "Professor" Dr. Hristova participates with a total of 12 projects, of which as a leader of research projects funded by the NSF at Sofia University - 4; as a member of a team of research projects funded by the Ministry of Education and Science - 5 pieces and in 3 international educational projects, contributed to the international recognition and raising the scientific prestige of the faculty, as well as the candidate.

Assoc. Prof. Hristova has an indisputable organizational and managerial capacity. From 2016 to 2020 he is Deputy. Dean of Bachelor's Degree, Faculty of Biology, Sofia University; and from 2016 until now he is the head of the Department of General and Industrial Microbiology at the Faculty of Biology at Sofia University and the head of the Ministry of Culture "Food Quality and Safety" in Agrobiotechnology.

5. Personnel training and educational and pedagogical activity

Over the years, the average annual workload of Assoc. Prof. Hristova in the Faculty of Science at Sofia University as a lecturer is high and varied. According to the presented report for 2015-2020, the average classroom employment of Dr. Hristova is 448 hours, and the average total study load is 711 hours, while only for the academic year 2017-2018 her total study employment is 977 hours. Dr. Hristova's teaching experience extends beyond Sofia University, in the form of lectures and practical courses conducted abroad in the period 2001-2005. in the following disciplines: in the Department of Food Microbiology, ENITIA - Nantes, France, she taught courses in "Molecular Biology", "Microbiology" - Module of classes from the course in "Food Microbiology" with different workload; "Food Hygiene" and "Food Microbiology".

The courses on the basis of which the excellent teaching experience of Assoc. Prof. Hristova are formed are the lectures on "Microbiology", "Microbiology and Virology" in Pharmacy, FHF, Sofia University, "Pathogenic Microorganisms", "Molecular Biology of Prokaryotes and Eukaryotes" , "Food microbiology", "Microbiological control of food and food products", "Biological hazards in food" and "Cellular pathogens". She has created in the practice of BF a new master's program in "Food Quality and Safety" for full-time and part-time education. She has developed and conducted two compulsory courses: "Microbiological control of food and food products" and "Biological hazards in food". She has been the scientific supervisor of over 20 successfully defended graduates, of 2 successfully defended doctoral students and is the scientific supervisor of three other current doctoral students. All this defines the candidate as a successful teacher and an established scientist.

6. Conclusion

For the competition Assoc. Prof. Hristova presents herself with respectable scientometric data. The described original scientific and scientific-applied results are of high scientific value and are obtained using the most modern methods for microbiological and genetic analysis. The active publishing activity, citations, the successful management of doctoral students and graduates, the high lecture load, the participation in international and national and projects, characterize Assoc. Prof. Dr. Hristova as a highly erudite scientist and undisputed expert in the field of general and food microbiology and fully meet the requirements for the academic position of "professor", both under the Law on Academic Development in the Republic of Bulgaria and internal regulations. SU "St. Kliment Ohridski", Faculty of Biology. All that has been said so far gives me full conviction to propose to the esteemed Scientific Jury to vote for the award of Assoc. Prof. Dr. Petya Koycheva Hristova to the academic position of "Professor".

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Sofia

Prepared the opinion:

/ prof. Dr. Elena Georgieva /