

REVIEW

By Ass. Prof. Lyudmila Filipova Belenska-Todorova, PhD, Ass. Prof. of Human Biology, Department of Biology, Medical Genetics and Microbiology at the Faculty of Medicine of Sofia University "St. Kliment Ohridski"

Regarding:

Competition for the academic position of "associate professor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.3. Biological Sciences (Microbiology), announced in State Gazette No. 56/30.06.2023 for the needs of the Department of Biology, Medical Genetics and Microbiology at the Faculty of Medicine of Sofia University "St. Kliment Ohridski".

The staff of the scientific jury was determined by Order of the Rector RD-38-541/15.09.2023 based on the decision of the Faculty Council of the Faculty of Medicine (Protocol No. 118/04.09.2023).

1. Correspondence of the submitted documents of the candidate, according to the Rules for occupying academic positions of SU "St. Kliment Ohridski"

The procedure for disclosure and announcement of the competition has been followed. The review has been prepared in accordance with the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of this law and Section IV - Terms and Procedures for Occupying the Academic Position "Associate Professor" of the Regulations for the Terms and Procedures for Acquiring Scientific Degrees and occupying academic positions at SU "St. Kliment Ohridski".

The applicant's documents fully meet the requirements for admission and participation in a competition for the academic position of "associate professor" at SU "St. Kliment Ohridski". They are presented in sequence from No. 1 to No. 19 and include attached evidentiary material: CV; Master's degree diploma; Diploma for educational and scientific degree "doctor"; Document for academic positions "assistant" and "chief assistant"; Certificate of work experience in the specialty; Certificate of recognized specialty in "Microbiology (for microbiologists and biologists)" and certificates of completed postgraduate training courses in this specialty; List of

scientific publications (list of all publications and list of publications submitted for participation in the competition); List of participations in scientific forums; List of participations in scientific projects; Sample reference for the fulfillment of the minimum national requirements for occupying the academic position "associate professor" with evidence; Citation Reference; Reference to original scientific contributions; Scientific works submitted for participation in the competition; Summaries of peer-reviewed publications in Bulgarian and English; Copy of the announcement in the State Gazette; Other documents and materials for the applicant's activity.

2. Biographical data, professional and academic development of the candidate

Chief assistant Lyubomira Dimitrova Yocheva, PhD graduated from the "National Science and Mathematics High School "Acad. Lyubomir Chakalov", prized with a silver medal for excellence in the educational process, after which she entered SU "Kliment Ohridski", in the specialty "Molecular and Functional Biology" where she obtained a master's degree with a Qualification: biochemist – microbiologist with specialization: microbiological, pharmaceutical and agropreparative productions. In 1997, she was awarded the educational and scientific degree "Doctor", for which she received a diploma from the Higher Certification Committee No. 24745 dated 26.05.1997 for the specialty Microbiology, (code: 01.06.12).

She acquired a Certificate for a recognized specialty in Microbiology (for microbiologists and biologists) reg. No. 021106 dated 28.07.2017, and in connection with this she took a number of courses, from which she acquired theoretical knowledge and practical skills in general, special, sanitary and clinical microbiology; antimicrobial chemotherapy; general immunology; modern molecular methods; epidemiology; virology; parasitology; microbiological diagnosis of infections caused by staphylococci, streptococci, enterococci, corynebacteria, enterobacteria, anaerobic bacteria, legionella, mycobacteria, leptospira, borrelia, listeria and other causes of particularly dangerous infections.

Lyubomira Yocheva worked successively as a technologist-microbiologist at the Institute of Cereals and Feed Industry, "Bread Production and Baby Foods" section, as a research assistant II at the National Bank for Industrial Microorganisms and cell cultures in the "Laboratory for Actinomycetes", as a research assistant I at the Institute of Cryobiology and Food Technologies at the National Center for Agrarian Sciences. For the eriod of 2002-2006 dr. Yocheva was a part-time

assistant in the Department of "General and Industrial Microbiology" of the Faculty of Biology, SU "St. Kliment Ohridski".

After successfully passing the competitive exam, she held the position of assistant (2006 - 2007) and chief assistant (since 2007) in the Department of Biology, Medical Genetics and Microbiology, Faculty of Medicine, SU "St. . Kliment Ohridski". She very conscientiously, strictly and devotedly performs various types of educational, administrative, organizational and expert activities in the Faculty of Medicine, as well as activities as a medical specialist in microbiology in the clinical microbiology laboratory of Lozenets Hospital (2007 - 2019).

3. Evaluation of the candidate's educational and teaching activities

Ch. Assistant Professor Lyubomira Yocheva, PhD is a teacher with an extremely intensive long-term academic work in the field of Microbiology. The academic employment report of Dr. Yocheva shows that her classroom employment in the subject "Microbiology" for 2nd and 3rd year students in the specialties "Medicine", "Medicine in English" and "Nurse" at MF of Sofia University is over 7,200 academic hours.

Dr. L. Yocheva teaches practical classes in microbiology for students from the specialty "Optometry" in the Faculty of Physics of SU "St. Kliment Ohridski", microbiology exercises for students from the "Biology", "Geography and Biology" and "Biology and Chemistry", exercises in the course "Taxonomy of Microorganisms" of students in the Master's program "Microbiology and Microbiological Control". Dr. Yocheva has also conducted summer training with students from the "Biotechnologies" specialty, as well as lectures and practicals in the course "Immunodiagnosics of pathogens" for students in a master's program "Biochemistry" at the Department of Biochemistry in the 2017/2018 academic year. She prepares a new program, develops and leads a new course "Protective mechanisms in bacterial infections" of 30 hours of lectures and 15 hours of exercises for students in the Master's program "Biochemistry" at the Department of Biochemistry.

Ch. Assistant Professor Lyubomira Yocheva was the supervisor of three diploma theses for the Master's program "Microbiology and Microbiological Control" at the Faculty of Biology of the University of St. Kliment Ohridski" in 2007 and 2009.

During the establishment of the Faculty of Medicine at the SU, Dr. Lyubomira Yocheva was an active participant in the launch of teaching in the discipline "Microbiology". Since then, she has taken an active part in the preparation of the practical classes and the development of the curricula and programs in "Microbiology" for students of the specialty "Medicine" and "Medicine in English" at the Faculty of Medicine of SU.

She is a member of the commissions in the preparation, conducting and evaluation of candidate student exams in biology and chemistry in Bulgarian and in English for students majoring in "Medicine" at the Faculty of Medicine.

Ch. Assistant Professor L. Yocheva is part of the team of authors of a manual for practical exercises in "Microbiology" for students majoring in "medicine", published in Bulgarian and in English. She is also the co-author of a textbook related to the teaching of "Food Microbiology" for students majoring in Biology.

4. Evaluation of the candidate's scientific, applied scientific and publication activity

The scientific activity of the candidate ch. Assistant Professor Lyubomira Yocheva, PhD, are in full compliance with the criteria and indicators recommended in the documents for evaluation by the Scientific Jury when conducting a competition for "associate professor". The scientific works submitted for a review are in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.3. Biological sciences, scientific specialty "Microbiology".

Dr. Lubomira Yocheva is an author of published and reported scientific works with a significant contribution in the field of Microbiology.

The general scientific production presented by Dr. Lyubomira Yocheva includes: published scientific works – **55** (of which **26** in journals with an impact factor and/or impact rank/quartile according to SJR, of which **3** are related to the dissertation work); reported scientific works in international and national scientific forums – **45** (of which **2** are related to the dissertation work). The contributions of Dr. Lyubomira Yocheva in research projects are **15** (project manager - 4 at the SRF of the SU; participation - 4 at the MES and 7 at the SRF of the SU).

The impact factor (IF) values of all her publications are: **total IF – 16.215**, individual **IF – 1.926**, **H-index - 3**.

For her participation in the current competition Dr. Lyubomira Yocheva has presented **45** published scientific works, of which **23** in journals with an impact factor and/or impact rank/quartile according to SJR; reported scientific works in international and national scientific forums – **36**, which were not reviewed in previous competitions for awarding scientific degrees and academic positions. The contributions of Ch. Assistant Dr. Lyubomira Yocheva in scientific research projects are 15: project manager – 4 at the Scientific Research Institute of the SU; participation - 4 to MES and 7 to FNI of SU.

The values of the impact factor (IF) of her publications are: **total IF - 16,108**, individual **IF - 1.89**, H-index - 3. The total number of citations presented for the competition so far compared to Scopus /Web of Science is **39 citations**.

All scientific works submitted for the competition expand and build on research, both in the field of fundamental and in the field of applied scientific activities, and are beyond the dissertation work for the acquisition of the ONS "Doctor". The minimum requirements of the National Center for Information and Documentation (NACID) for acquiring the academic position "Associate Professor" in the Higher Education Department 4. Natural sciences, mathematics and informatics, professional direction 4.3. Biological Sciences, are presented in the table below. For comparison, there are the indicators of ch. assistant Professor L. Yocheva for her participation in the competition.

Group of indicators	Content	Minimum National Requirements for Associate Professor	Points according to the indicators of dr L. Yocheva
A	Indicator 1	50	50
B	Indicator 2	-	-
C	Indicator 3 and 4	100	105
D	Sum of points of indicators from 5 to 10	200	239
E	Sum of points of indicators from 11	50	78
Total number of points by indicators A-E		400	472

According to indicator A.1. Dissertation work for awarding the educational and scientific degree "doctor" ch. assistant professor L. Yocheva, Ph.D., presented documents for her dissertation work

for the acquisition of the ONS "Doctor", defended in 1997 before the Higher Attestation Committee, on the topic "Biological characteristics of a strain of *Streptomyces galbus* (F) subsp. *achromogenes* 695, chemical nature of antibiotic 695 and optimization of the conditions for its biosynthesis" with scientific supervisor Prof. Dr. Lyubomir Kominkov at the Department of "General and Industrial Microbiology", Faculty of Biology of SU. According to this indicator, she has the required number of **50 points**, according to the legal requirements.

Regarding indicator C.3. Habilitation thesis - scientific publications in publications that are referenced and indexed in world-famous databases with scientific information (Web of Science and/or Scopus) the candidate participates with scientific publications that are in journals with the following quartiles: Q1 – 1 article (25 points), Q2 – 1 article (20 points), Q3 – 4 articles (total 60 points). The sum of indicator C.3. is **105 points**, with a minimum of 100 points required.

According to indicator D.7. Scientific publications in publications that are referenced and indexed in world-famous databases with scientific information (Scopus and Web of Science), outside of the habilitation work, scientific publications are in journals with quartiles: Q2 – 1 article (20 points), Q3 – 9 articles (135 points), Q4 – 7 articles (84 points). The amount of indicator D. 7. is **239 points** with a required minimum of 200 points, which significantly exceeds the minimum regulatory requirements for this indicator.

According to indicator D.II. Cited in scientific publications, monographs, collective volumes and patents, referenced and indexed in world-renowned databases of scientific information (Web of Science and/or Scopus) the candidate has submitted 39 citations, which equals **78 points**, with a required minimum of 50 points.

Dr. Lyubomira Yocheva has included in her documents data on indicators that are not required in the current competition, but are of serious value for the evaluation of the candidate's research and teaching capacity. According to indicator E, Dr. Yocheva has attached data on her participation in 3 national projects, and in appendix 7 a list of 4 institutional projects at the Scientific Research Fund of the SU of which she was the head, as well as another 8 in which she was participant. In the documents for the competition, 35 participations in scientific forums other than those related to the dissertation work are indicated. One published university textbook is listed in indicator E.19, and 3 published university textbooks are listed in E.20, one of which is in English. In total, in

indicator group E, the candidate has 57 points, although they cannot be included in the final assessment because they are not explicitly required in the current competition.

In conclusion, the scientometric indicators of Chief Assistant Professor Dr. Lyubomira Yocheva meets the requirements for acquiring the academic position "Associate Professor" at Sofia University, and with the required total minimum of 400 points for the relevant indicators, she exceeds the requirements and has a total of **472 points**.

5. Analysis of the candidate's scientific contributions

The scientific interests of Dr. Lubomira Yocheva and the published scientific results are in the field of the announced competition.

The most significant results of Dr. Lyubomira Yocheva's research work are described in the "Reference on original scientific contributions" attached to the competition documents. They are in several areas of microbiology: antimicrobial activity of naturally produced biologically active substances and nanomaterials; isolation and characterization of bacteria of importance in food technology and biotechnology; sanitary-microbiological evaluation of water for drinking and household needs; spread of some bacterial and viral infections in Bulgaria and their relationship with inflammatory, allergic or autoimmune diseases. In addition, Dr. Yocheva has also contributed to academic education as an author of textbooks. This makes the presented data applicable in the competent practical and theoretical training in the discipline "Microbiology" of the medical students, as well as in the supervision of the specialists in the "Microbiology (for microbiologists and biologists)", for which Dr. Lubomira Yocheva has a diploma.

I. Contributions to the field of antimicrobial activity of naturally produced biologically active substances and nanomaterials

A. Antimicrobial activity of biologically active substances produced by medicinal plants, microalgae and cyanobacteria

The main publications included in the habilitation work under indicator B4 are aimed at this area.

One part of them is about newly obtained data on the inhibitory activity of extracts and fractions of four species of genus *Hypericum*, growing in Bulgaria, and of species of genus *Stachys*, which are endemic rare or endangered species.

Data on the antimicrobial and antioxidant activity of green microalgae (*Coelastrrella sp.* BGV) and cyanobacteria (*Arthronema africanum* Lukavsky (*Synechococcales*), *Nostoc commune* Vaucher (*Nostocales*) and *Chroococcus sp.* R-10 (*Chroococcales*).

These studies contribute to a more complete pharmacological characterization of the tested extracts and fractions of the listed species of plants and microorganisms and represent a good basis for further testing of the most active ingredients as food supplements or as drug candidates with antibacterial and antifungal effect. *In vitro* creation and *ex vitro* cultivation of plant crops instead of wild plants as a valuable source of natural substances with antimicrobial effect have been successfully achieved, which makes this alternative approach applicable to the conservation of endangered and rare plant species.

B. Antimicrobial potential of lactic acid bacteria

About 130 strains of lactic acid bacteria (lactobacilli, streptococci and pediococci) and 3 strains of bifidobacteria isolated from different sources (fermented dairy, meat and vegetable foods; microalgae and plants; faecal and vaginal samples; saliva) were screened for inhibitory activity, as part of them are from the collection of the company "Laktina". It has been confirmed that the production of lactic acid is a leading factor in the antimicrobial activity of the studied strains. Species and strain specificity in inhibitory activity was found. The safety of the studied strains was proven in terms of their sensitivity to a certain set of antibiotics. Strains have been selected that are proposed for the production of starter cultures and probiotic preparations for children and adults, including for use in all preparations of the Lactoflor series (Kendy Pharma), as they are aimed at overcoming intestinal or uroinfections, as well as dysbacteriosis with involvement of *Candida albicans*. These contributions are of a scientific and applied nature.

C. Studies on the biology of streptomycetes as producers of biologically active substances

Newly isolated streptomycete strains from Bulgarian and Antarctic soils were studied. For their full characterization a number of studies were carried out on their biosynthetic potential as producers of antibiotics from the streptomycin group and their taxonomic status, as well as tracking

the influence of cultivation and storage conditions on their metabolic productivity. It should be emphasized that the candidate is one of the few specialists in Bulgaria with experience in working with streptomycetes.

D. Antimicrobial activity of newly synthesized or commercial nanomaterials

The effectiveness of different approaches for the synthesis and combination of metals and metal oxides in the development of new nanomaterials for medical applications has been investigated. The antimicrobial activity of newly synthesized zinc oxide nanomaterials as well as those coated with silicon oxide was studied. Data were obtained that the chemical composition of the metal nanoparticles in the combined nanocomposites has a decisive role for their antibacterial effect, emphasizing the importance of collagen suspensions of nanocomposites. A comparative assessment of the antibacterial effect of commercial nanoparticles (selenium, gold, iron oxide, silicon oxide and graphene oxide) in the form of dispersions was made.

II. Contributions to the isolation and characterization of bacteria relevant to food technology and biotechnology.

*A. Microflora of spontaneous fermentation of chickpea grains (*Cicer arietanum* L.)*

The contributions of research in this area are of a scientific-theoretical and applied nature, as the microbial composition of the chickpea yeast used in the production of simid was specified for the first time. It has been established that various representatives of the genus *Clostridium* and the genus *Bacillus* participate in it, of which the butyric acid-producing clostridia are particularly important for the production of yeast with good technological properties. The candidate participates in the creation of a collection of clostridial strains and in the study of optimal conditions for their storage, cultivation and application in biotechnological production.

B. Microflora of rye sourdough/dough

The candidate participates in obtaining a number of new food microbiology data regarding the microflora of Bulgarian rye sourdough starters from different geographical regions of the country, and they are of an applied nature. The involved strains of lactic acid bacteria and yeasts were isolated and identified, and for the first time a polyphasic approach to the identification of lactobacillus strains was applied, including identification by classical methods, confirmed by species-specific PCR analysis and subsequent 16S rDNA sequencing analysis). For the first time,

strains of lactic acid bacteria have been identified that could serve to develop grain-based diet foods aimed at people with lactose intolerance and dairy allergies.

C. Microflora of raw dried sausages

The candidate's contributions are based on a project together with the company "Tandem" and have a marked applied nature for food microbiology. For the first time, a complete microbiological analysis of a naturally fermented Bulgarian raw-dried sausage - Panagyurska lukanka - has been carried out.

III. Contributions in the field of sanitary-microbiological evaluation of water for drinking and domestic needs

The candidate participates in the sanitary-microbiological analysis of bottled mineral water, spring water and water from boreholes and wells in private properties and in small settlements in Western Bulgaria. The obtained data are mainly applied in nature and are important for establishing the complete safety of water from the listed sources. They also draw the attention of the authorized services to the need for stricter and regular sanitary-microbiological control of water sources in small settlements in order to minimize the risk of outbreaks of local water epidemics.

IV. Contributions in the field of the spread of some bacterial and viral infections in Bulgaria and their relationship with inflammatory, allergic or autoimmune diseases

The candidate participated in a study conducted for the first time in our country on the serological prevalence of *Helicobacter pylori* in asymptomatic children. The research has an important contribution to medicine, as the data show that children are infected at a very early age, they are mostly asymptomatic carriers, and the infection manifests itself later. Indicative data on the relationship between *Helicobacter pylori* infection and the pathogenesis of psoriasis have also been obtained. The research has an applied nature, as it points to fusidic acid as a suitable first-line antibiotic for topical therapy of atopic dermatitis against *Staphylococcus aureus* colonization in skin lesions in children. Unequivocal results were obtained suggesting with high probability the participation of *Herpes simplex virus 1* and *Epstein-Barr virus* in the pathogenesis of psoriasis with autoimmune bullous dermatoses and not confirming the participation of hepatitis B and hepatitis C viruses.

V. Contributions to academic education

The candidate is one of the authors of a practical manual, prepared in Bulgarian and English in accordance with the established microbiology training program for medical students at the Faculty of Medicine of Sofia University.

6. Personal impressions of the candidate

I have known Dr. Lyubomira Yocheva since 2008, when I joined the department of "Biology, Medical Genetics and Microbiology" at the Faculty of Medicine of the SU and where we work together to this day. Since then, I have witnessed her development as a scientist and teacher. She has excellent knowledge and practical skills in the field of medical, general and industrial microbiology. She possesses a high level of professionalism, performing all the activities necessary for teaching students in the specialties "Medicine", "Medicine in English" and "Nursing" with extreme precision and responsibility. Dr. Yocheva possesses bright personal qualities such as dedication, correctness, precision, reliability and responsibility, which makes working with her calm and effective. She is a highly respected teacher and specialist in the university and scientific microbiology communities. Her research work is intensive and fruitful. All these qualities define her as a candidate who fully meets the requirements for holding the academic position of "associate professor".

Conclusion

The scientific data of chief assistant professor Dr. Lyubomira Yocheva are not only in line with, but also exceed the minimum national requirements, normative criteria and indicators for evaluating candidates when holding a competition for the academic position of "associate professor" in professional direction 4.3. Biological Sciences.

In general, the original scientific results obtained by Lyubomira Yocheva have an indisputable scientific-applied and fundamental contribution character, with possibilities for application in medical practice. Without a doubt, she is a well-rounded researcher and teacher who excels both in teaching, organizational and scientific activities and significantly exceeds the minimum national requirements set out in the Law on the Development of the Academic Staff in the Republic of

Bulgaria for holding the position of "Associate Professor" in the field of higher education 4. Natural sciences, mathematics and informatics, Professional direction 4.3. Biological Sciences (Microbiology).

Based on everything stated above, I give my positive assessment and with full conviction I recommend to the members of the Scientific Jury to make a decision on the selection of chief assistant Lyubomira Dimitrova Yocheva, PhD for the position of "associate professor" in professional direction 4.3. Biological Sciences, scientific specialty "Microbiology" and occupying this academic position in the Department of "Biology, Medical Genetics and Microbiology" at the Faculty of Medicine of SU "St. Kliment Ohridski".

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Author of the review:

Associate professor Lyudmila Belenska-Todorova