

SCIENTIFIC OPINION

by **Prof. Maria Bogomilova Angelova-Dyankova**, DSc, The Stephan Angeloff Institute of Microbiology, Bulgarian Academy of Sciences
Scientific area 4. Natural Sciences, Mathematics and Informatics, 4.3. Biological sciences, Scientific specialty Microbiology
Concerning: competition for the academic position ASSOCIATED PROFESSOR in the Medical Faculty at Sofia University in the field of higher education 4. Natural Sciences, Mathematics, and Informatics; professional field 4.3. Scientific specialty Microbiology, submitted to a scientific jury, formed by Order No. RD-38-541/15.09.2023 of the Rector of Sofia University

In the competition for the position of "Associate Professor", announced in the State Gazette, no. 56 of 30.06.2023 were received documents of Dr. Lyubomira Dimitrova Yocheva, Senior Assistant Professor at the Department of Biology, Medical Genetics and Microbiology at the Faculty of Medicine of Sofia University "St. Kliment Ohridski".

I. General presentation of the procedure and the candidate

For participation in the competition, Dr. Lyubomira Yocheva has submitted the necessary documents and materials proving the fulfillment of the requirements for the academic position of Associate Professor on electronic media. All of them are in accordance with the Law on the Development of Academic Staff in the Republic of Bulgaria (LADRB), the Regulations for its implementation, as well as with the Regulations of Sofia University "St. Kliment Ohridski". The competition documentation is well compiled and reflects in a comprehensive volume the teaching, research, and project activities of the candidate.

Dr. Lyubomira Yocheva graduated from the Faculty of Biology at the University of St. Kliment Ohridski" in 1986. She has a master's degree in Molecular and Functional Biology. In 1997, she received the educational and scientific degree "Doctor" at the Faculty of Biology of Sofia University. Her scientific career began in 1996 as a microbiologist at the Institute of Cereals and Feed Industry at the Academy of Agriculture, passed through the National Bank for Industrial Microorganisms and Cell Cultures (research associate II degree) and the Institute of Cryobiology and Food Technologies (researcher associate I degree). Since 2006, she has been successively an assistant and chief assistant in Microbiology in the Department of "Biology, Medical Genetics, and Microbiology" of the Faculty of Medicine at SU "St. Kliment Ohridski". Her postgraduate specialization in Microbiology (for microbiologists and biologists) as well as 11 courses in various aspects of Medical Microbiology undoubtedly contributed to her growth as a scientist. Dr. Yocheva also has administrative experience. She is a long-term member of the Commission for checking and evaluating candidate student works in biology and chemistry and a member of the Commission for checking and evaluating written works of students from the "Talented Biologist" module for admission to NPMG. The candidate is a member of the Union of Scientists in Bulgaria and the Bulgarian Association of Microbiologists.

The scientific and pedagogical career of the candidate is entirely related to the topic of the competition and reflects current and promising areas of general, medical, and food microbiology.

II. Characteristics of the applicant's activities

Overview of the candidate's scientific works

Assoc. Prof. Lyubomira Yocheva is the author of 55 scientific publications, 1 textbook, and 3 teaching aids. For the competition, she has submitted 23 scientific articles in refereed journals indexed in world-known databases, 1 textbook, and 3 teaching aids. Of the research articles, 16 were in IF journals and 7 in SJR.

For participation in the competition, the candidate submitted:

- Indicator A - abstract for PhD - 50 points.
- Indicator B - 6 scientific articles in journals with IF or with rank and quartile - 105 points.
- Indicator D - 17 scientific articles, 12 with IF, and 5 with quartile rank - 239 points.
- Indicator E - 39 citations (SCOPUS) - 78 points.
- Indicator F - although not mandatory for the academic position of Associate Professor, the candidate has activity towards this indicator:
 - Participation in 3 national scientific and educational projects - 30 points.
 - Co-author of 1 textbook - 13 points.
 - Co-author of 3 textbooks - 14 points.

The report on the fulfillment of the minimum requirements for the academic post of Associate Professor shows that the candidate meets and exceeds the required points for the individual indicators, gaining **529 instead of the required 400**.

III. Teaching and Learning Activities

Teaching is one of the main activities of the candidate and is entirely in the field of competition. She has been teaching students since 2007. As an Assistant and Senior Assistant at the Department of Biology, Medical Genetics and Microbiology of the Faculty of Medicine at Sofia University "St. Kliment Ohridski" she conducts exercises in Microbiology in the specialties "Medicine" and "Medicine in English" and Virology in the course "Microbiology, Parasitology and Virology" for students in the specialty "Nursing". Since 2013, she has been leading microbiology exercises for students of the specialty "Optometry" in the Bachelor and Master Programs at the Faculty of Physics of SU.

For the last 5 years at the Faculty of Medicine, the candidate has 4372 hours of total workload, 3934 of which are auditorium employment. This data as average annual employment corresponds to 874 h of total workload and 786 h of auditory employment. In addition, she has participated in lectures and exercises in Bulgarian (162/40 hours) and English (36/9 hours) at the Department of Biochemistry of the Faculty of Biology at Sofia University.

At the same time, Dr. Yocheva is involved in the training of young staff. She has been a supervisor of 3 graduate students in Bachelor's and Master's programs. Her activity includes also 1 textbook and 3 teaching aids, which can be used by students at several universities, secondary school teachers, and professionals in microbiological practice.

On the basis of the above, I highly appreciate Dr. Yocheva's teaching and learning activities. In my opinion, this activity is significant in scope, covers important areas in the field of the announced competition, and fulfills the mission of a University teacher.

IV. Research activity

Dr. Lubomira Yocheva's scientific works fully cover the topic of the current competition, namely Microbiology. They reflect the activity of the candidate in many current aspects - search for new antimicrobial agents, food, sanitary and medical microbiology. Four scientific directions are outlined, in which important scientific and applied contributions are formulated.

1. Antimicrobial activity of biologically active substances and nanomaterials. With this direction, Dr. Yocheva is involved in the problem of drug resistance, the relevance and perspective of which are indisputable. The antimicrobial activity of biologically active substances produced by medicinal plants, green microalgae, and cyanobacteria, as well as the antimicrobial potential of lactic acid bacteria (LAB) and newly synthesized or commercial nanomaterials, were studied. Research has been conducted on the biology of *Streptomyces*, producers of biologically active substances. The following more important contributions can be formulated here:

1.1. New information was obtained regarding the antimicrobial spectrum, the minimum inhibitory concentration (MIC), and the minimum bactericidal concentration (MBC) of Bulgarian medicinal and wild plants.

1.2. The potential of St. John's wort extracts to inhibit or modulate the biofilm formation of methicillin-resistant *Staphylococcus aureus* (MRSA) has been demonstrated based on the inhibition of the expression of one of the genes (*icaD* gene) related to the synthesis of the intercellular matrix.

1.3. The potential of antibacterial extracts of the genus *Hypericum* as food supplements or medicine has been proven.

1.4. For the first time, the antimicrobial spectrum of plant cultures of the genus *Stachys* was characterized *in vitro* and *ex-vitro*, and its identity with that of *in situ* wild plants was demonstrated.

1.5. New original data were obtained, which complement the scarce information regarding the antimicrobial effect of green microalgae of the genus *Coelastrella* and newly isolated Bulgarian strains of cyanobacteria.

1.6. Novel probiotic strains of ICD with antibacterial properties were isolated and identified. The mechanism of their antagonistic and direct inhibitory action was studied. On the basis of the conducted research, probiotic preparations for children and adults have been formulated and implemented in practice, including all preparations from the Lactoflor series (Kendy Pharma).

1.7. New strains of the genus *Streptomyces*, producers of antibiotics, were isolated from Bulgarian and Antarctic soils. The conditions for cultivation and storage of their metabolic productivity are optimized.

1.8. A detailed characterization of newly synthesized nanoparticles, nanoclusters and nanocomposites based on reduced graphene and zinc oxide has been made regarding their antibacterial activity. New data were obtained on the effect of nanocomposites with zinc oxide in combination with metal nanoparticles (copper and silver) dispersed in collagen suspensions. 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.

2. Isolation and characterization of bacteria of importance in food technology and biotechnology. The works here formulate original contributions to the now-current field of healthy nutrition.

2.1. New strains of the genera *Clostridium* (causative agents of butyric acid fermentation) and *Bacillus* and LAB have been isolated from unstudied substrates traditional to the Bulgarian table. They were taxonomically identified and characterized as effective starter cultures.

2.2. For the first time, modern molecular biological methods were used to identify LAB from Bulgarian rye starters and Bulgarian raw-dried sausage.

3. Sanitary-microbiological assessment of water for drinking and domestic use. This field includes the activity of the candidate in the direction of sanitary-microbiological analysis of bottled mineral and spring waters and waters from boreholes and wells in private properties and small settlements in Western Bulgaria. The contributions here can be summarized as follows:

3.1. The need for monitoring bottled mineral water and that with public access, as well as well and borehole water in private properties for their compliance with the sanitary-microbiological criteria under the BDS, has been proven.

3.2. Prescriptions have been proposed to improve the quality of some spring waters.

4. Prevalence of some bacterial and viral infections in Bulgaria and their relation to inflammatory, allergic, or autoimmune diseases. The aim of the studies in this area is to test the validity of the hypothesis about the role of some viral and bacterial infections in the pathogenesis of inflammatory, allergic, or autoimmune diseases. The contributions of the candidate can be formulated as follows:

4.1. Seroprevalence of *Helicobacter pylori* in asymptomatic children and patients with psoriasis has been demonstrated.

4.2 A clear and statistically significant trend of colonization with *Staphylococcus aureus* in skin lesions of Bulgarian children with atopic dermatitis has been established.

4.3. New data were obtained on a significant prevalence of specific serum antibodies to Herpes simplex virus 1 (HSV-1) and Epstein-Barr virus (EBV) antigens in patients with autoimmune bullous dermatoses (AIBD) compared to a control group of patients diagnosed with psoriasis and a control group of healthy subjects, which unequivocally indicates with high probability the involvement of HSV-1 and EBV in the pathogenesis of AIBD.

I positively evaluate Dr. Yocheva's research activities in terms of subject matter, methodical approaches, and achievements. I want to emphasize that the research is complex, involving specialists with different qualifications, as required by today's science. The contributions formulated are innovative and significant, both original scientific and those with a marked applied significance. Achievements of an obvious theoretical and methodical character, including obtaining new information and confirming known data in the main directions of microbiology, are on the face. In my opinion, Dr. Yocheva has her own place in the activities of the teams she works with, her qualifications and experience contribute to a large extent to the realization of ideas and the achievement of goals. This also defines her personal share in the contributions as significant.

V. Participation in research projects

The candidate presents information on participation in 15 scientific research projects, 4 of which are financed by the "Scientific Research" Fund. Dr. Yocheva is the head of 4 of them. All of them are in the field of microbiology (general, food, and medical microbiology) and correspond to the announced competition.

CONCLUSION

The documents and materials presented by Dr. Lyubomira Yocheva, meets all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of the law and the relevant Regulations of the SU "St. Kliment Ohridski". The candidate in the competition has submitted a sufficient number of scientific works published after the materials used in the defense of the ONS "Doctor". Dr. Yocheva's scientific and teaching qualifications are unquestionable. The results achieved by the candidate in the study and research activities fully correspond to the minimum national and additional requirements of the SU. I want to emphasize that Assist. Prof. Lyubomira Yocheva, Ph.D., is an established and promising scientist in the field of the current competition, distinguished by her own scientific profile and modern research approach. Her teaching activity corresponds to the current requirements of training in higher education. She is the author and co-author of study programs, textbooks, and study aids, and works actively with graduates. She is a sought-after partner in the development of scientific projects and an active member of the teams she works with. The presented scientific articles define her as a professionally competent specialist. Formulated scientific and applied contributions are a basis for further developments.

After getting acquainted with the materials and scientific works presented in the competition, after analyzing their significance and the scientific and scientific-applied contributions contained in them, I give my positive assessment and strongly recommend the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Medicine for selection to **Assistant Professor Dr. Lyubomira Dimitrova Yocheva** at the academic position "**ASSOCIATED PROFESSOR**" in the field of higher education 4. Natural sciences, mathematics, and informatics, professional direction Biological sciences, scientific specialty Microbiology.

October 20, 2023

Sofia

Signature:.....

/Prof. Maria Angelova, DSc/