

REVIEW

by Prof. Dr. Andon Vasilev Andonov from the Agricultural University - Plovdiv

of the materials submitted for participation in the competition for the academic position of
"Professor" at the Plovdiv University "Paisii Hilendarski"

in: field of higher education 4. Natural Sciences, Mathematics and Informatics

professional field 4.3. Biological Sciences (Phycology)

The competition for the academic position of "Professor" was announced in the State Gazette, issue 98 of 19.11.2024 and on the website of Plovdiv University "Paisii Hilendarski" (PU) for the needs of the Department of Botany and Biological Education at the Faculty of Biology. Assoc. Prof. Dr. Ivanka Ivanova Teneva-Dzambazova from the Department of Botany and Biological Education at the Faculty of Biology of PU participated in the competition as the only candidate.

1. General presentation of the received materials

By order No. RD-22-439 of 18.02.2025 of the Rector of Plovdiv University "Paisii Hilendarski" (PU), I have been appointed as a member of the scientific jury of a competition for the academic position of "Professor" at PU in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences (Phycology).

The set of materials on paper and electronic forms presented by Assoc. Prof. Dr. Ivanka Ivanova Teneva-Dzambazova is in accordance with the Regulations for the Development of the Academic Staff of PU, and includes the following documents:

- Application to the rector of the Plovdiv University for admission to the competition
- Autobiography in European format
- Diploma of higher education
- Diploma for educational and scientific degree "Doctor"
- Certificate of holding the academic position "Associate Professor"
- List of scientific works
- Copies of publications
- Certificate of compliance with the minimum scientometric national requirements
- Certificate of compliance with additional faculty requirements
- Declaration of originality and reliability of the results and contributions
- Extended habilitation certificate
- Annotation of the materials (in Bulgarian and English)
- Self-assessment of the contributions (in Bulgarian and English)
- List of citations of scientific works

- Certificate of registration for holding the title of "Associate Professor" in NACID
- Documents certifying work experience, educational, scientific and organizational-administrative activity with the relevant attachments in the form of certificates, orders, copies of title pages of works, etc.

The set of materials presented by the candidate is complete and complies with the regulatory requirements. I would like to note that all documents prepared by the candidate are precisely formatted and comprehensive, which facilitates the review process.

Assoc. Prof. Dr. Ivanka Teneva participates in the competition with a total of 18 scientific papers, 2 book chapters, 4 textbooks and 4 teaching aids, which are attached. From the list of the candidate's general scientific production (document No. 6) it is clear that they were not used in procedures for acquiring the ESD "Doctor", as well as for occupying the academic position "Associate Professor", which is why I accept them for review.

2. Brief biographical data of the candidate

Ivanka Teneva graduated from the Faculty of Biology of the Plovdiv University in 1995 with a qualification as a teacher of biology and chemistry. After several years of work as a teacher and expert in chemistry, she turned to scientific research. In the period 2001 – 2007, through competitively won scholarships, she conducted several long-term specializations in prestigious scientific centers in Germany and Sweden (Marie Curie Training Site Fellowship, UFZ - Centre for Environmental Research, Leipzig, Germany, 2001-2002; Scholarship from UFZ, 2002-2003; Marie Curie Grant, Medical Inflammation Research, Lund University, Sweden, 2005 – 2007).

In 2007, after successfully defending a doctoral dissertation on the topic "Taxonomy, phylogeny and toxic potential of some species of blue-green algae (Cyanoprocaryota)", she received the ESD "Doctor" in the scientific specialty of Botany. In the period 2007-2009, Dr. Ivanka Teneva was a research associate 1st rank at the Plovdiv University, implementing a research project for reintegration, funded by the Marie Curie ERG program. From 2009 to the present, she has been working in the Department of Botany and Biological Education of the Plovdiv University, where, after successful competitions, she successively held the academic positions of Assistant Professor (2009), Chief Assistant Professor (2010) and Associate Professor of Botany (2013).

3. General characteristics of the candidate's activities

Evaluation of teaching and pedagogical activities

Assoc. Prof. Dr. Ivanka Teneva has extensive teaching activity and significant experience in teaching students (bachelor's, master's and doctoral students) at the Plovdiv University and its branches in the city of Smolyan and the city of Kardzhali. Her total teaching experience in the subject of the competition is 16 years and 8 months, which meets and at the same time exceeds the additional faculty requirement for a minimum experience of 10 years. She leads lecture courses with students in the Bachelor's program in Phycology, Bioresources, Mycology and Plant Systematics, exercises in

Phycology and Plant Systematics and field practices in Plant Systematics, as well as lectures and exercises with students in the Master's program in Phyto- and mycotoxins in foods, Toxicology, Algology, Phytotoxicology, etc. The lectures of Assoc. Prof. Dr. Ivanka Teneva are taught according to her developed and approved curricula (17 in total). According to the attached author's reference, the annual volume of teaching hours that she has completed over the past 5 years exceeds the required minimum.

Assoc. Prof. Dr. Ivanka Teneva is the author of a textbook on Phycology (second revised and supplemented edition), which examines the main structural, physiological and ecological features of algae, as well as some aspects of their practical importance and use. The textbook is a main source of information in the training of students in this biological discipline. In addition to the mentioned textbook, she is a co-author of 3 other textbooks on Pharmaceutical Botany, respectively, Part I (first edition), Part I (second revised edition) and Part II (first edition). By participating in the mentioned editions, the candidate fulfills the additional faculty requirement for publishing at least one textbook in the respective specialty of the competition. In addition, Assoc. Prof. Dr. Ivanka Teneva is also a co-author of 4 textbooks on Mycology, which are for students of the specialties "Ecology and Environmental Protection", "Biology", "Medical Biology" and "Pharmaceutical Biotechnologies", which were developed according to the specifics of the exercises in the mentioned specialties.

Assoc. Prof. Dr. Ivanka Teneva is the co-supervisor of two successfully defended doctoral students in the scientific specialty Botany, which is in accordance with the faculty requirement for participation in the education of at least two young scientists. She has also supervised three defended graduates in the Bachelor's program.

Along with her significant academic work, Assoc. Prof. Dr. Ivanka Teneva is actively involved in a number of other organizational and administrative activities at the Plovdiv University. She has participated in committees for (●) attestation of teachers, (●) eligibility of candidates in competitions, (●) conducting state exams and defense of diploma theses, (●) ethics committee, etc.

General information about the candidate's scientific and applied scientific activities and their compliance with the minimum scientometric indicators specified in the Regulations for the Implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB) and the additional requirements of the Faculty of Biology of the Plovdiv University

Assoc. Prof. Dr. Ivanka Teneva conducts research in the field of Phycology, with her research mostly focused on representatives of cyanobacteria (Cyanobacteria, Cyanoprokaryota). More specifically, the subject of interest is their exact taxonomic position, biodiversity, their ability to produce various biologically active substances, their genomic composition, the relationships they enter into with other groups of organisms inhabiting water bodies, etc. The candidate's additional research is related to the study of phytochemical, biological and toxicological characteristics of

higher plants, as well as studying the possibility of creating a vaccine against pollen allergens of grass group 1.

The scientific output with which Assoc. Prof. Dr. Ivanka Teneva participates in this competition corresponds to the minimum scientometric indicators and additional requirements of the Plovdiv University. The specific values for the relevant groups of indicators are as follows:

For group of indicators A, the candidate has attached a copy of a diploma for the acquired ONS "Doctor" in 2007, which receives the required 50 points.

For group of indicators B4, the candidate presents 6 scientific publications, covering the requirement for habilitation work. They form 130 points with a minimum requirement of 100. The candidate is the first, last and corresponding author, which is evidence of a high personal contribution to the conduct of the research and the preparation of the publications.

Group G indicators (indicators G7 and G8) include 12 scientific publications and 2 book chapters, forming a total of 234 points with a required minimum of 200.

The scientific publications of Assoc. Prof. Dr. Ivanka Teneva, belonging to groups B and G, are referenced and indexed in the international databases WoS and Scopus and are published in authoritative scientific journals with a high impact factor (IF). Among them are Plants (Q1, IF=4), Chemosphere (Q1, IF=5.78), Heliyon (Q1, IF=3.4), International Journal of Molecular Sciences (Q1, IF=5.6), etc. The publications have the following distribution by quartiles: Q1–6 issues, Q2–5 issues, Q3–2 issues, Q4–2 issues and without Q, but with SJR – 3 issues. The total IF of the articles is high - 40.602.

Group of indicators D (indicator 11) reflects citations of the 18 articles of the candidate in literary sources referenced in WoS and Scopus. 199 citations were noted, forming a total of 398 points. This result exceeds several times the minimum requirement for citation (100 points). The high citation corresponds to the high Hirsh (h-factor) of Assoc. Prof. Dr. Ivanka Teneva – 12 (in WoS and Scopus) and indicates a high relevance of the research conducted by her.

Group E includes the candidate's activities related to (●) leadership and participation in scientific projects (9 projects, 247 points), together with (●) leadership of successfully defended doctoral students (50 points) and (●) authorship of textbooks and teaching aids (83.9 points). The data show that Assoc. Prof. Dr. Ivanka Teneva actively participates in the implementation of international, national and university research projects. She was the coordinator of the Bulgarian team in 1 international project, the leader of 2 projects at the Bulgarian Science Research Fund and 1 internal university project, as well as a participant in 2 international (bilateral cooperation) and 3 national projects. The indicated results testify to the candidate's ability not only to conduct, but also to organize and lead large-scale scientific research.

Assessment of the contributions related to the candidate's scientific production

Assoc. Prof. Dr. Ivanka Teneva has classified the contributions from her research into 7 groups. The extended habilitation report includes research in 4 of them, which are related to studies on cyanobacteria, and the contributions from the remaining 3 groups refer to other research.

I highly appreciate the extended habilitation report prepared by Assoc. Prof. Dr. Ivanka Teneva. It clearly presents the current state of research with cyanobacteria, defines the scientific tasks on which the candidate is working, as well as the place and significance of his own research for solving current scientific problems. The habilitation report very objectively outlines the candidate's scientific profile in the field of Phycology.

I believe that the main part of the candidate's scientific results represent contributions of a scientific and scientifically applied nature. I accept the author's summary of the essence of the contributions, but I believe that they could be presented in a more synthesized form. I will only point out some of the most significant, in my opinion, scientific and applied scientific contributions in the main research groups.

A significant part of the candidate's research is aimed at resolving the taxonomic status of controversial species by applying polyphasic taxonomy and developing new taxonomic criteria (G7-12, G7-11, G7-9, B4-1, B4-6, B4-4, G7-3, G7-8). For this purpose, the candidate applies and further develops the method of polyphasic taxonomy. This is a complex approach that combines molecular-genetic, morphological, ultrastructural, biochemical, ecological and other indicators for assessing the taxonomic position and identification of different species of cyanobacteria. Undoubted scientific contributions in these studies are the proposed additional markers for identification, namely: (●) 39 compounds from metabolomic analysis for the distinction of the cyanobacterial species *Phormidium autumnale* and *Microcoleus vaginatus* (B4-1); (●) the proteins (OMER) Psb27 and the proteins of photosystem II CP43 and CP47 as markers for conducting phylogenetic analyses in cyanobacteria (G7-12, G7-11, G7-9); (●) the pigments phycocyanin, phycoerythrin, allophycocyanin and phycoerythrobilin as biochemical markers for distinguishing cyanobacterial strains at the genus and supergeneric level (B4-6), etc.

Another part of the candidate's research is focused on revealing the structure of phytoplankton in Bulgarian dams, performing a toxicological assessment, as well as assessing the ecological status of freshwaters by applying newly developed indices. Studies have been conducted on the qualitative and quantitative composition of phytoplankton in Lake Vaya and the Studen Kladenets dam. A toxicological analysis for the presence of cyanotoxins has been carried out in Lake Vaya and in three dams in the Pleven region (Northern Bulgaria) - Krushovitsa, Valchovets and Enitsa. Scientific contributions to these studies are: (●) the established producers of cyanotoxins and especially the first report of the presence of cylindrospermopsin in a Bulgarian dam (B4-4); (●) the fact established for the first time that the species *Anabaenopsis elenkinii* is a producer of microcystins, cylindrospermopsin and saxitoxins (G7-3), as well as (●) the first report of the *Picochlorum*

oklahomense /*Synechococcus* sp. community in the composition of autotrophic picoplankton of a European coastal lagoon (G7-8), etc.

The third part of the research of Assoc. Prof. Dr. Ivanka Teneva is related to the study of the allelopathic effects of cyanotoxins produced by cyanobacteria on common algae species. The influence of the cyanotoxins microcystin-LR (MC-LR) and cylindrospermopsin (CYL) on green algae (*Chlamydomonas asymmetrica*, *Dunaliella salina* and *Scenedesmus obtusiusculus*) was studied (B4-2). Scientific contributions of important ecological significance here are the established inhibitory effects of cyanotoxins on the growth, motility, morphology and photosynthesis of algae.

The next research group of the candidate is aimed at establishing the biological activity and toxic potential of representatives of cyanobacteria (division Cyanobacteria). The interest in this aspect is motivated by the fact that cyanobacteria are a source of a large number of biologically active metabolites with a wide spectrum of action and with possible application for the needs of pharmacology, food industry, cosmetics and biotechnology. The chemical composition and biological activity of extracts and metabolites from different cyanobacterial species (G7-6; B4-3; B4-5; B4-6) have been studied. A new approach has been developed and applied for rapid screening of immunomodulatory properties of cyanobacterial extracts (B4-3). The new results obtained in these studies are scientific contributions with possible application for practical purposes. Such are the established facts about: (●) high antioxidant activity of *Anabaena laxa* extract; (●) the diverse protective-biological activities of substances from the cyanobacterial strain PACC 8600, including antibacterial activity against gram-negative and gram-positive strains; (●) the antioxidant and toxic potential of a significant number (45) components produced by *Fischerella major*; (●) the high potential of 18 cyanobacterial strains from *Microcoleus autumnalis* and *Leptolyngbya boryana* for the production of phycobiliproteins - water-soluble pigments with wide application in biotechnology, the food industry and medicine.

In the research of Assoc. Prof. Dr. Ivanka Teneva, more scientific and applied scientific contributions can be identified, but I think that the ones mentioned so far give a clear idea of the significance of the research she conducted.

4. Assessment of the candidate's personal contribution

The candidate's personal contribution to the research consists in the selection and cultivation of strains, preparation of samples for analysis, laboratory work to establish their activities and the preparation of scientific publications.

5. Critical remarks and recommendations

I have no critical remarks about the candidate.

CONCLUSION

The documents and materials presented by Assoc. Prof. Dr. Ivanka Teneva-Dzambazova meet the requirements of the LDASRB, the Regulations for its implementation in Plovdiv University "Paisii Hilendarski" as well as additional requirements of the Faculty of Biology. The candidate in the competition has presented a sufficient number of scientific works published after the materials used in the defense of the ESD "Doctor" and the academic position "Associate Professor". The candidate's works have been published in international journals with a high impact factor. They contain original scientific and applied contributions that have received international recognition, assessed on the basis of a high number of citations. The results achieved by the candidate in academic and research activities exceed the minimum national and additional requirements of the Faculty of Biology.

After reviewing the materials and scientific papers presented in the competition, analyzing their significance and the scientific and scientific-applied contributions contained therein, I find it reasonable to give my positive assessment and to recommend to the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Biology for the election of Assoc. Prof. Dr. Ivanka Teneva-Dzhambazova to the academic position of "Professor" at the Plovdiv University "Paisii Hilendarski" in: field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences and the scientific specialty - Phycology.

5.04.2025 г.

Reviewer:

/Prof. Dr Andon Vasilev Andonov/