# REWIEW

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regarding the materials submitted for the associated professor position announced by the Plovdiv University in the field of *5. Technical sciences*, 5.11 *Biotechnology (Ecological and Agro-Biotechnology)*

## 1. General presentation of the materials

I have been appointed as a member of the scientific jury for the current competition by the Rector of Plovdiv University "Paisiy Hilendarski" (Order RD21-335/15.02.2023). The position was announced in State Gazette, issue 92/18.11.2022 according to the procedure adopted. Only one candidate submitted documents for the announced vacant position - assistant professor Ivan Iliev, Ph.D. who is currently a lecturer in the *Department of Biochemistry and Microbiology*.

The set of document and materials submitted by the candidate are in accordance with the National and University rules and regulations and include the following:

- Request to the Rector for admission to participate in the competition
- CV
- Copies of diplomas for acquired degrees (MSc and PhD)
- List and copies of the scientific publications
- List of citations
- list of the minimum criteria for the academic position of associate professor and references to their coverage by the candidate

- Annotation of the materials by the candidate in accordance with Article 65 of the Plovdiv University's rules for academic staff development.
- Self-assessment scientific and applied contributions
- Declaration of authenticity and originality of the documents and materials submitted
- Certificates and documents related to the professional, research and teaching experience of the candidate

With regard to publication activity, the candidate provided a list of 45 scientific paper (13 of which are not subject of review here due to their relation to PhD thesis defence and presentation in previous competition for assistant professor position). Beside the scientific papers, one monograph book, two authorship certificates for technology commercialization and two university grade books co-authored by the candidate are also included in the list of the materials to be reviewed. Along with the papers and books, Dr. Iliev applied relevant documents for his participation in significant number of research projects and students teaching at the Biology Faculty of Plovdiv University (PU). As a conclusion, the content of the submission is relevant to the position announced, the regulations and rules for academic career development and the evaluation procedure could proceed to analysis of the materials and the candidate contributions.

## 2. Short biography of the candidate

Ivan Iliev obtained a Master degree in Biology from the Faculty of Biology at the PU in 1996 and later (in 2015) obtained PhD in Microbiology in the same university and faculty. His doctoral study focused on the microbial and hydrological indicators for the status of cage aquaculture, a topic which matches his professional interest at that period as a former researcher at the *Research Institute for Fisheries and Aquaculture*.

In the last 12 years, Ivan Iliev has been part of the teaching team of the Faculty of Biology at the PU as an assistant professor. During this period, he actively

participated in the training of students (both BSc and MSc courses) on different topics from the curricula such as Microbiology, Bioremediation and Microbial Ecology.

The scientific work of the candidate is focused on the water quality assessment using physical, chemical and biological parameters with emphasis on the evaluation of the carrying capacity of aquatic ecosystems in terms of sustainable aquaculture production. In this sense, the teaching and research profile of the candidate is addressing directly the specific field of the announced position which is a subject of this competition.

## 3. General characterization of the activities demonstrated by the candidate

### *Teaching activities*

Ivan Iliev is a researcher and university teacher with over 16 years of academic experience, a significant part of which in the *Department of Biochemistry and Microbiology* at the Faculty of Biology. As an assistant professor, he is directly involved in the work with the students and also contributed to the development of programs and methods used in education in the Faculty of Biology. This approach ensures complementing the best teaching practices of the faculty with the personal expertise of the teaching stuff. As a part of his assistant professor work, Ivan Iliev supervised and co-supervised 8 graduation theses of MSc students, all of them on topics related to the microbiology and hydrochemistry of water, microbial ecology, clinical microbiology and bioremediation.

The *Microbiology* protocols guide and the Second Edition of the *Biotechnological Processes and Equipment* textbooks co-authored by the candidate cover two of the main aspects of modern education in Biotechnology – the biological fundaments and the methods for characterization and evaluation of microorganisms and engineering and technological methods for implementation of biotechnological processes.

In general, it can be summarized that the teaching experience and the activity of Ivan Iliev is matching the traditions and standards of the *Department of Biochemistry and Microbiology* and the Faculty as centre for education in the field of the biological sciences.

***Research activity***

The first part of the analysis of the candidate's research activity and scientific contributions is in the context of the minimum national requirements for the academic position of Associated Professor defined in corresponding regulations.

With regard to the Group of Criteria A (PhD degree and dissertation) there is full coverage of the requirements. Ivan Iliev obtained the degree after defending a PhD thesis on the *Microbiological and hydrobiological status of cage aquaculture in the "Kardzhali" Dam, Bulgaria*. Group of Criteria B is not applicable and there is no minimum requirement for the specific academic position which is a subject of this competition. With regard to the Group of Indicators C, the candidate has submitted a monograph entitled *Technology for Ecological Assessment and Planning of Sustainable Aquaculture in Complex and Significant Dams*, which covers the required minimum of 100 points. The next group of indicators include mainly publication in different type and rank of scientific journals. In sub-criteria 7 here (publications in journals indexed in international databases) 25 publications co-authored by Ivan Iliev are presented which forms 233.5 points score. According to sub-criteria 8 (Scientific publications in journals, books and proceedings with scientific review and without indexing) the presented publications are 7 with score of 37.2. Thus, the total score for the group is 270.7 (from minimum 200 points required). Regarding the citations of the scientific publication of the candidate, the minimal number required is 5 citation or 50 points score. In this criteria, Ivan Iliev scores more than 1400 points as a result of the 171 citations reported. Here it can be concluded that this is a result of the quality of the published material and the research behind it. In addition to this and to to cover the requirements for research activity, the candidate has presented list of 22 projects which he participated as a research team

member in the period 2006-2021. The teaching activities were already mentioned and the related criteria is cover with 313.3 points.

At the end of this long paragraph, I would only note that Dr. Ivan Iliev meets the requirements for occupying the associate professor position with a total of 2148 points (with required minimum of 400). Here is the place to note that beside the national requirements, the candidate covers and fulfils the additional requirements according to the policies for academic staff development of the Faculty of Biology at PU.

The materials presented by the candidates show a wide field of scientific interests and expertise. According to the specific research objects and the methods applied, the scientific work and contributions could be grouped as follow:

1. *Evaluation of the ecological status of surface waters baes on the microbiological activity, physical and chemical parameters and bio-indicators.*
2. *Characterization of water and soil microbiome with emphasis on the bioremediation potential*
3. *Clinical microbiology, antimicrobial therapy and antibiotics resistance.*
4. *Technologies and practices for sustainable aquaculture*

Regarding the first group of research, the motivation and relevance of the problems studied are indisputable considering the key importance of water as a resource - both with its biological function and its industrial and social importance. In this sense, water quality assessment is a key element of the effective water resources management. In the monograph book presented by Dr. Ivan Iliev, research data on various indicators of the state of water and aquatic ecosystems are presented and analysed in terms of their relation to the carrying capacity for the development of aquaculture. The scope of the monograph includes nine complex dams located in the

four river basin management regions in Bulgaria. Due to the geographical distribution and variety of location and conditions presented conclusions have been drawn about the influence of many secondary factors on the water status including: hydrological regime; evaporation and climate; inflowing waters characteristics and anthropogenic factors. All data are considered in the context of existing environmental regulations and legislation framework. In the main part of the study, an approach for assessing the complex dams of different lake for their fish farming and aquaculture potential was proposed and validated. For the implementation of this research task, the nutrient removal and utilization capacity of the water bodies are studied. The key factor identified here was the biological activity of microbial communities and phytoplankton. The data obtained provide new definition and indicators for the water status later included in the river basins management programmes of the governmental institutions in connection with sustainable fish farming

Articles 1, 2, 3, 6, 7 and 14 from the list of publications in indexed journals and articles 1 and 2 from the papers published in non-indexed peer-reviewed journals have contributed to this group of studies. Certain trends in the number and type of microbial and phytoplankton taxa presented were related to the seasonal dynamics and the water quality parameters (turbidity, salinity, total nitrogen, phosphates etc.).

The main research topic of the scientific publications reviewed so far makes a smooth transition to the second research direction through the application of the modern methods of the molecular biology in microbial biodiversity and communities research. For instance, in article 5/list III (publications in indexed journals) the microbial biodiversity of soil samples was analysed based on next generation sequencing of ribosomal genes in combination with physiological and metabolic characterization of the isolated strains. It has been established that the treatment of soils with bio-fertilizers stimulates the saprophytic bacteria known for their antagonism towards plant pathogens. In publications 8 and 25 of the same list, a similar approach was applied to samples from two different wetlands from the Maritsa River watershed in attempt to clarify the influence of agro activity on the

profile of the microbial populations. The anthropogenic influence on the microbial communities in soils and waters is also a subject of other publications, as in article No. 9/List III where the influence of heavy metal pollution in soils located near busy roads is studied.

Soil microorganisms are an interesting area of study not only for their role in the geochemical cycles or being and bio-indicator for the ecological status of their habitats, but also for their potential to produce enzymes and other biotechnological products. This is reflected in several of the publications co-authored by Dr. Ivan Iliev. The ability of different strains and species of Bacillus and Pseudomonas genus are studied starting with selection of super producers, cultivation optimization and isolation of enzymes with high specific activity.

The third group of publications presented by the candidate concerns the problems of microbial pathogenesis, antimicrobial therapy and antibiotic resistance. Data from studies of the antimicrobial activity of extracts from different Bulgarian varieties of tobacco (Article No. 11, list III) toward gram positive and gram negative bacteria and yeasts are indicated. In another study, high antibiotic resistance of *Enterobacteriaceae* family to quinolone derivatives, beta-lactam and tetracycline antibiotics was investigated and reported. These results, as well as the data on the biofilm-forming ability and antibiotics sensibility of clinical isolates of *Candida* (described in publication No. 6 of list IV), are relevant to the strategies for treatment of uro-genital infections, usual caused by species from the above mentioned taxa.

The last 4th sub-direction in the scientific activity of the candidate integrates the knowledge and data obtained during the research and transfers it to the field of applied science and industry. An aquaculture technology for growing pike been developed, including a brief description of the species and the requirements for its cultivation in artificial and natural condition. In addition to the yield assessment, the importance of the species as an ecological factor in water bodies is also presented. Good production practices for sustainable pond farming of carp at the farm level have been formulated and published as a handbook. Breeding methods, feed and feeding,

transport of stocking material and fish products are systematized and described. Special attention is paid to environmental conditions and water quality indicators, which could be used as a basis for management and automation of the aquaculture industry.

**CONCLUSION**

The documents and materials presented by Dr. Ivan Iliev meet all the requirements for the academic position he applies for both in terms of national and University defined criteria.

The candidate has submitted a significant number of scientific publications which contain original scientific and applied contributions to the relevant scientific field. This was confirmed and validated through the commercialization of certain scientific products and through the citations in the scientific periodicals. The area of research is interdisciplinary and integrates fundamental knowledge form the field of biological sciences with the practice of ecological monitoring, bioremediation and sustainable aquaculture. The topics are directly oriented to the educational and teaching profile of the Faculty of Biology at the PU and covers the specific area of the announced competition, namely environmental and agro-biotechnology.

After getting acquainted with the materials and research work presented by the candidate and analysing his scientific and applied contributions, I give my positive assessment and recommend the Scientific Jury to prepare a positive report-proposal to the Faculty Council regarding the appointment of Ivan Iliev as an Associate Professor in 5. Technical sciences, professional direction 5.11 Biotechnologies at Plovdiv University.

10.04. 2023 Reviewer: .....

Assoc. Prof. H. Yemendzhiev