OPINION

From: Prof. Anelia Evgenieva Kenarova, Ph.D, Faculty of Biology, Sofia University "St. Kliment Ohridski", member of the Scientific Jury, appointed by order No. RD-38-548 of 19.09.2023 of the Rector of SU "St. Kliment Ohridski", Prof. Dr. Anastas Gerdjikov

REGARDING: competition for the academic position of "associate professor" at Sofia University "St. Kliment Ohridski" in the field of higher education 4. Natural sciences, mathematics and informatics; professional direction 4.3. Biological sciences, Hydrobiology - water management.

The competition for the academic position "associated professor" in the field of higher education 4. Natural sciences, mathematics and informatics; professional direction 4.3 Biological sciences, Hydrobiology - water management, has been announced for the needs of the department of "General and Applied Hydrobiology" at the Faculty of Biology of SU "St. Kl. Ohridski" in State Gazette no. 67/04.08.2023. In the period regulated by the Law, Ass. Prof. IVAYLO DIMITROV YOTINOV, Ph.D submitted his documents as the only candidate for this competition. The candidate works on a permanent employment contract in the same department.

1. General presentation of the procedure and the candidate

The materials for participation in the competition are available online on the website of BF - SU (https://www.biofac-unisofia.com/index.php/s/gMSSCkya6N7ejGD). They have been prepared in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations concerning the implementation of the LDASRB, the Regulations concerning the Terms and Procedures for Acquiring Scientific Degrees and Holding Academic Positions at SU "St. Kl. Ohridski". They also satisfy the minimal national recommended criteria for occupying the academic position "associate professor" in professional direction 4.3. Biological Sciences. The documentation for the competition is structured according to the requirements of the SU, and makes it possible to follow the educational-pedagogical, scientific, scientific-applied and administrative activities of the candidate in terms of qualitative and quantitative indicators.

Ass. Prof. Ivaylo Yotinov, is a graduate of SU "St. Kl. Ohridski", Faculty of Biology. He graduated in Biology in 2010 and continued his studies in the Master's program "Environmental Biotechnologies", where he graduated in 2012. He defended his doctoral thesis in July 2016 on the topic "Strategies for bio-management of self-purification in sediments at the cascade from the MWEPs Sreden Iskar" in the Department of "General and Applied Hydrobiology". Ivaylo Yotinov continued his academic career in the same department, initially as an assistant, and later as a head assistant.

Ass. Prof. Yotinov presented a list of 43 works as general scientific production. It has a total IF of 46.59, h-index (Scopus) 4 and distribution of his works as follows: 17 scientific articles in refereed and indexed journals, 1 useful model, 9 publications outside the list of publications for the competition, 15 papers printed in conference proceedings and 1 thesis abstract. The presented works were cited 63 times.

In the competition for the academic position "associated professor", 18 scientific works were presented. Of them: 1 useful model, 17 scientific articles in international refereed and indexed journals, distributed by quartiles as follows: Q1 – 3 nos., Q2 - 7 nos., Q3 - 3 nos., Q4 – 3 nos. and 1 with SJR (referenced by Scopus), but without Q. A search in Scopus/Web of Science as well as other databases shows that these works have 45 and 18 citations, respectively (63 citations in total). The results of the research activities were reported at 76 scientific conferences - 33 international and 43 both national and national with international participation.

Ass. Prof. Yotinov participated in 32 scientific and educational projects (10 national, 12 at the FNI of SU and 10 funded by business). They reflect both the research and scientific-applied activity, as well as his educational activity in the professional direction of the competition.

Ass. Prof. Ivaylo Yotinov is the winner of several awards, some of them for the best poster at scientific conferences, he is the winner of a scholarship named after brothers Evlogi and Hristo Georgievi, award by the Ministry of Environment and Water for an innovative youth project, an entrepreneurship award for creating an innovative biotechnological product, Sofia Municipality award for Best Young Scientist for 2021.

2. General evaluation of the candidate's activity

2.1. Assessment of candidate educational and pedagogical activity

Educational and pedagogical activities of Ass. Prof. Ivaylo Yotinov covers the educational and qualification degrees: "Bachelor" and "Master". On average, the total and auditorium study employment over the last 5 years are 480 and 361 hours, respectively. It covers the lecture courses at the Bachelor's degree (Water Management) for the specialties "Biomanagement and Sustainable Development" (BMUR), Ecology and Environmental Protection and Biotechnology and at the Master's degree for the "Biobusiness and Bioentrepreneurship" (Key Directions in Biobusiness and Management and Marketing in Biobusiness). Regarding the practical classes, Ass. Prof. Yotinov leads classes in 6 disciplines in the "Bachelor" degree and 4 disciplines in the "Master" degree. There are 18 successful graduates, all during the competition period (2017 – 2023). The candidate participates in a number of initiatives of the laboratory "Ecological Biotechnology and Biological Water Purification" and the Center of Competence "Clean & Circle" within the framework of the implementation of some projects such as: targeted training of primary and secondary school students, creation and development of a 'Business Incubator' with partners from the industry for training students under the dual educational system, Yotinov was a mentor and academic mentor in various bioentrepreneurship trainings, participated in a number of external practical classes of students in Power plant for surface water purification and Sofia power plant for waste water treatment for with students, and conducted summer training practices.

2.2. Evaluation of the scientific and scientific-applied activity

Scientific works

Candidate's report on the fulfillment of the minimum national requirements under Art. 2b of the LDASRB for scientific area 4. Natural sciences, mathematics and informatics; professional direction 4.3. Biological Sciences shows a set of scores that fully meet these indicators as follows:

- ✓ **Indicators from group A**: thesis work - 50 points.
- ✓ **Indicators from group B**: habilitation work - scientific publications that are referenced and indexed in world-famous databases with scientific information (Scopus) - **105** points (with a minimum of 100 points).

- ✓ **Indicators of group G**: scientific articles in international refereed and indexed journals - **224** items (with a minimum of 200 items). I reduce the indicated 229 points in group G to 224 points, since publication No. G7.2 is with Q3 (respectively 15 points), and not as indicated by the candidate – 20 points.
- ✓ **Indicators from group D**: cited works - **90** points (with a minimum of 50 points). The candidate listed 44 cited publications (or 88 points), but check in Scopus database shows 45 number of citations (without self-citations of all authors of the publications).

Scientific, scientific-applied and methodical contributions:

The candidate's contributions are focused on developing and proposing concepts for the management of water treatment processes and the water cycle in natural ecosystems, as well as in water supply and sewage systems in order to preserve and increase the efficiency of water resource utilization. These contributions can be grouped as achievements of scientific, scientific-applied and methodical significance. In this manner the achievements will be reflected in the opinion.

Main scientific contributions:

- ✓ Establishment of key biological indicators for control and management of water treatment processes. In this context, the candidate has found the biological relationships between micro- and meta-fauna with the bacterial associations in the bio-basins of water treatment plants, as well as functional activity of sediment microbial communities in the area of the Middle Iskar cascade.
- ✓ The stages and models of bio-detoxification of the xenobiotics amaranth and phenol, as well as of complex pollutants in leachates from municipal waste landfills, were established. Various functional groups of microorganisms, as well as representatives of the *genus Pseudomonas* and the *genus Acinetobacter*, were found in the active sludge of the bio-degradation processes.
- ✓ Inclusion of enzymological (various types of dioxygenases, phosphatases, nitrate-reductases) and molecular (presence of functional groups of microorganisms) indicators as key indicators of water treatment process in order to improve the effectiveness of process control.
- ✓ For the first time, FISH was applied to elucidate the role of the *genus Acinetobacter* in detoxification processes in river sediments.
- ✓ The FISH analysis was used to follow both the transformations of polyphosphates and polyphosphates' binding to the reserve energy sources of the cells
- ✓ The key role of *genus Pseudomonas* and *genus Acinetobacter* in the biotransformation of xenobiotics was confirmed and the rate of the detoxification process was investigated. It has been established that in case of explosive phenol loading of aquatic ecosystems, the microbial community reacts with an increase in the number of the representatives of these two genera.
- ✓ Use of molecular methods at the functional and structural levels for biological control of biogas production from sewage sludge was introduced.
- ✓ Basic stages of the self-purification processes in natural water ecosystems have been established and the patterns of these processes have been established in the event of a water risk loads with phenol.
- ✓ The effectiveness of using nanodiamonds as an augmentation factor to improve the bioremediation in river sediments has been determined. The effects of nanodiamonds on key microbial groups involved in the detoxification process have been established. For the first time,

hypotheses have been proposed for the mechanisms of the augmenting effect of nanodiamonds on the biodegradation of aryl-containing xenobiotics.

- ✓ The effects of argon SWD plasma on the microorganisms of treated water were determined and the main factors with a significant effect on the deactivation process were determined.
- ✓ Brief plasma treatment has been shown to increase oxygenase activity of *Pseudomonas aureofaciens* AP-9.

Main applied-scientific contributions:

- ✓ The processes of self-purification in sediments are modeled in conditions close to real ones.
- ✓ Nanodiamonds are applied to accelerate self-purification processes in river sediments.
- ✓ The bioaugmentation technique using *Pseudomonas aureofaciens* AP-9 was introduced for the biodegradation of a xenobiotic (amaranth) in activated sludge from a city sewage treatment plant. The relationship of *Pseudomonas* with the natural groups of micro- and meta-fauna was followed.
- ✓ The positive effects of nanodiamonds on the bioremediation of heavily phenol-contaminated sediments in a model system with conditions close to real ones has been established. A number of enzymological (functional) and structural responses of microbial communities have been differentiated and characterized.
- ✓ Plasma deinactivation of microorganisms has been proposed as a method for decontamination of water, and with further research, also of liquids for medical purposes.
- ✓ In the laboratories of "Veolia-Sofiiska voda" JSC and "Kubratovo", two main indexes have been introduced, filament index of actived sludge and biotic index of actived sludge, to control the state of the activated sludge in treatment plants.

Main methodological contributions:

- ✓ The candidate participated in the introduction of the following methods of analysis in laboratory work:
  - filamentous index of actived sludge and biotic index of actived sludge - laboratories of "Veolia-Sofiiska voda" and "Kubratovo"
  - total organic carbon of waters and sediments - laboratory of "Biological water treatment and ecological biotechnology" in the Faculty of Biology of SU
  - microbial identification and classification using Biolog's OmniLog^{R} system
  - characterization of micro- and meta-fauna from waters/sediments/activated sludge by confocal electron laser microscope
- ✓ The candidate adapts and introduces the above mentioned methods in the training of students

2.3. Assessment of administrative activity

Ass. Prof. Yotinov actively participates in the administrative work of the Faculty of Biology as:

- ✓ Head of Master's Program "Biobusiness and Bioentrepreneurship" from 2018 to present
- ✓ Administrative Secretary of the Management Board of the Competence Center "Clean Technologies for a Sustainable Environment - Water, Waste, Energy for a Circular Economy" from 2018 to the present
- ✓ Member of the Commission on proposals for governing bodies of the faculty, from 2020 to the present

- ✓ Member of the Working Group of the specialty "Biomanagement and Sustainable Development" from 2019 to the present
- ✓ Member of the Faculty Council of the Faculty of Biology at SU "St. Kl. Ohridski", (quota of assistants) from 2020 to the present.

3. Assessment of the candidate's personal contribution

The presented scientific works and accompanying documentation from Ass. Prof. Ivaylo Yotinov, Ph.D., prove a convincing personal contribution to the experimental development, analysis, interpretation and publication of the scientific results. The author reference of the scientific works shows that the candidate in 13 out of 18 works (or in 72%) submitted for the competition is in first, second or third place in the author list. The candidate successfully integrates his scientific achievements in the teaching of students of the Faculty of Biology and students of the secondary level of education.

I know Dr. Yotinov from the student bench. As his former teacher and current colleague, I am convinced that he possesses all the professional qualities: scientific competence, teaching experience, excellent potential for teamwork and collegiality for the occupation of the academic position of "associate professor" at SU "St. Kl. Ohridski".

4. Critical notes and recommendations

I have no comments or recommendations regarding the presented materials and documentation, scientific and teaching activities.

5. Conclusion

All formal requirements specified in the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Rules for its Implementation and the Rules for the Terms and Conditions for Acquiring Scientific Degrees and Holding Academic Positions at SU "St. Kliment Ohridski" are fulfilled. The materials provided for the competition not only show that Ass. Prof. Ivaylo Yotinov has fulfilled the minimum national requirements for habilitation in accordance with the LDASRB, but in most of the groups of indicators there is a significant over-fulfilment of these requirements. With a required minimum of 400 points for all groups of criteria, the candidate has completed 469 points.

The critical analysis of the scientific, pedagogical and administrative activity of the candidate allows me to recommend with conviction to the honorable scientific jury appointed by order No. RD 38-548 of 19.09.2023 of the Rector of SU "St. Kliment Ohridski" to prepare a report-proposal to the Faculty Council of the Faculty of Biology of SU "St. Kliment Ohridski" for the election of Ass. Prof. IVAYLO DIMITROV YOTINOV, Ph.D 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, Hydrobiology - water management.

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