

OPINION

*in a competition for the academic position of "Associate Professor"
in the field of higher education: 4. Natural sciences, mathematics and informatics,
professional field: 4.2. Chemical sciences, Scientific specialty: Ecology and Environmental
Protection (Ion exchange and bioelectrochemical methods for water purification),
published in the State Gazette, issue 87/19.10.2021*

with candidate(s): **Blagovesta Nikolaeva Midyurova, PhD, Chief Assistant**

Member of the scientific jury: **Associate Professor Dr. Aleksandar Nikolov Dimitrov, University "Prof. Dr. Asen Zlatarov" – Burgas**, member of the Scientific Jury, appointed by Order № RD-322 of 22.11.2021 year of the Rector of the University

1. General characteristics of the candidate's research and applied scientific activity

The materials submitted for the competition, by the candidate Dr. Blagovesta Nikolaeva Midyurova are as follows: for indicator A – 50 points (meets the requirements); for indicator B – 100 pts. (complies); for indicator Г – 261 pts. (complies); for indicator Д – 108 pts. (complies); for indicator E – 110 pts. (in charge). The scores exceed the national minimum requirements and cover those according to the PURPNCZAD at University "Prof. dr. A. Zlatarov" - Burgas.

The candidate Blagovesta Midyurova participates with 1 independent scientific monograph, 17 publications indexed in world databases (Scopus and Web of science), 2 independent publications that are refereed and indexed in world databases with scientific information (Conference Proceedings); participation in 8 scientific research and/or educational projects (5 national and 3 international projects).

Throughout her professional scientific activity, Dr. Midyurova has authored and/or co-authored more than 40 publications and contributions to conferences, of which 20 have been indexed in world databases (Scopus and Web of science), and more than 20 contributions to peer-reviewed journals.

2. Evaluation of the candidate's pedagogical training and activity.

Concerning teaching and pedagogical activities, for the last 3 years, ch. ass. dr. Blagovesta Nikolaeva Midyurova, has an average volume of work of over 500 hours in Bachelor's degree and an average of 300 hours in Master's degree. She has been involved in the development of 12 curricula, 6 in undergraduate courses and 6 in Masters, including 1 ERASMUS+.

The candidate has developed and lectured 10 lecture courses, 11 courses with laboratory and practical exercises. Dr. Midyurova, successfully works with students and graduates both in the teaching process and with in research projects. She is the supervisor of 4 graduates in the Master's degree programme.

I highly appreciate the teaching training and activity of the candidate, and I believe she meets the requirements for the academic position of Associate Professor.

3. Main scientific and applied contributions.

The candidate, Dr. Blagovesta Nikolaeva Midyurova, has published an independent scientific monograph and a sufficient number of publications. In 15 of them, it is as a single author or in the first place, which is evidence of the personal contribution in them. The work presented also demonstrates her ability to work both independently and as part of a team.

The scientific and applied contributions of Blagovesta Midiurova's works are in the field of Ecology and Environmental Protection (Ion Exchange and Bioelectrochemical Methods for Water Purification), which corresponds to the announced competition for "Associate Professor".

They cover three of the priority areas of the "National Research Development Strategy 2030" and the "Research Development Strategy of "Prof. Dr. Asen Zlatarov" University for the period 2017-2025, namely – Environment (water, soil, air) and Biodiversity; Energy efficiency and alternative energy sources; Mathematical modelling and computer simulations.

Contributions from its activities are divided into 4 main areas: First: ionexchange methods in the treatment of natural waters – obtaining specific information on their composition and possible sources of contamination, their pre-treatment and conditioning; Second: Bioelectrochemical systems in wastewater treatment – studying the behaviour of bioelectrochemical systems in water treatment, investigating microbiological reactors, searching for alternative separators for microbiological fuel cells; Third: Methods for the assessment of surface water pollution – assessment of the status of aquatic ecosystems by physicochemical quality elements based on a classification system based on reference values for indicators, proposals of different methods for the assessment of surface water pollution; Fourth: Application of neural networks and fuzzy sets in bioelectrochemical systems, mathematical modeling and computer simulations – development of mathematical models and application of neural networks that lead to reduction of time and number of studies, and optimizes bioelectrochemical systems.

As main scientific and applied contributions I accept:

Process prediction in ionexchange systems, methods for analysis and conditioning of contaminated water streams [1.1]. Evaluation of the influence of some factors on the ionic strength, kinetics and dynamics of ionexchange [2.7]. Technological schemes for ionexchange softening have been applied to achieve an economical technological process with less anthropogenic pressure on the environment [2.3].

The effectiveness of bioelectrochemical methods for removal of organic matter without reagent pH increase, reduction of metal ions and desalination of water has been proven [2.13]. The performance of the Microbiological Fuel Cells (MFCs) has been investigated when working with electrodes of different composition [2.1]. Application of modified air cathodes, which have important advantages for the functionality of bioelectrochemical systems [2.8, 2.10]. The feasibility of improving the operational stability of the MFCs processes to commercialise the so-called "green" power generation systems has been investigated [2.19]. Different types of membranes from natural raw materials have been developed and applied in Bioelectrochemical Systems (BES). New electrodes have been developed to improve the diffusion processes through the membrane [2.16, 2.18].

The self-purification capacity of river water based on physicochemical indicators has been investigated [2.5]. A preliminary study has been done on air pollution that negatively affects water quality and damages ecosystems [2.17].

The Vollenweider method was applied to calculate a Trophic Index (TRIX) based on measured physicochemical and biological indicators in surface water ecosystems. The application of the TRIX index helps to take future actions and measures to prevent and protect water from pollution [2.4].

Prediction of microbial fuel cell behavior based on artificial neural networks [2.14]. Analysis of experimental and predictive data by modeling carbon emissions from the inlet and outlet of a primary settling tank from the Lukoil Neftohim Burgas Wastewater Treatment Plant and comparing with values obtained using Water 9.3® software and the U.S. EPA AP-42 algorithm [2.11]. The central

orthogonal compositional planning method was applied, defining the role of reaction parameters for the fabrication of air cathodes applied in BES. An adequate equation was obtained, allowing the model to be applied to an other type of polymer and catalyst [2.12].

4. Significance of contributions to science and practice.

The above scientific and applied contributions are significant for the development of practice and science. I highly appreciate the thoroughness of Dr. Midyurova's work.

This is evident by citations in international scientific journals such as *Journal of Power Sources* with an Impact Factor (IF) of 9.127, *International Journal of Hydrogen Energy* with an IF of 5.816, *Bioelectrochemistry* with an IF of 5.373, *RSC Advances* with an IF of 3.390, and others.

Five of the articles have more than 5 citations, with article 3.3 having 8 citations, 2.16 and 3.1 having 7 citations each. There are a total of 54 citations in this section. A proportion of the publications are cited from monographs.

In the process of her scientific research work, Ch. ass. dr. Blagovesta Midyurova has participated in several international scientific collectives. This is evident by the reviews provided by four international scientific organizations: *the American University of Sharjah, Tekirdag Namik Kemal University, Cyprus Science University and the University of Kragujevac.*

The materials submitted show that the Dr. Blagovesta Nikolaeva Midyurova is recognizable in academic and scientific society, and her expertise is sought when working in scientific projects.

5. Critical comments and recommendations

I have small and insignificant remarks – I could not find the candidate's participation in scientific conferences. My recommendation is: to continue to work actively for publications mainly in world famous databases.

CONCLUSION

In conclusion, I consider that the applicant meets the national requirements of the Regulations for the implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria, its Implementing Regulations and the PURPNCZAD at “Prof. Dr A. Zlatarov” – Burgas and the quantitative indicators of the criteria for the award of the academic position “Associate Professor”.

On the basis of the submitted documents and scientific works, their significance, the contributions contained therein, **I suggest** that the Faculty Council of the Faculty of Natural Sciences at the University “Prof. Dr. Asen Zlatarov” – Burgas **should elect the Chief Assistant Dr. Blagovesta Nikolaeva Midyurova for the academic position of Associate Professor** in the field of higher education: 4. Natural Sciences, Mathematics and Informatics, professional field: 4.2. Chemical sciences, scientific specialty: Ecology and environmental protection (Ion exchange and bioelectrochemical methods for water purification).

Date: 21.02.2022

JURY MEMBER:

Assoc. Prof. Dr. Aleksandar Dimitrov