

## STATEMENT

**By:** Professor Dr. Daniela Marinova Nikolova, Department of Ecology and Environmental Protection, Faculty of Biology, Sofia University “St. Kliment Ohridski”,

**Concerning:** the materials submitted for the competition for the academic position „Professor” of Sofia University “St. Kliment Ohridski”, in the professional area 4.3. *Biological Sciences (Ecology and protection of ecosystems - Ecology of microorganisms)* for the needs of the Department of Ecology and Environmental Protection, Faculty of Biology, SU “St. Kl. Ohridski”, announced in SG ed. 87 on 19.10.2021

In the announced competition the only candidate is Assoc. Prof. Dr. Anelia Evgenieva Kenarova, who presented all the necessary documents according to the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria for Higher Education area, The Regulations for its implementation, and the Regulations for the conditions and the order for acquiring scientific degrees and holding academic positions in Sofia University “St. Kl. Ohridski”. The documentation for the competition is structured in a way that fully reflects the educational, scientific and applied research activities of the applicant.

### **Brief biographical data about the candidate.**

Assoc. Prof. Dr. Anelia Kenarova graduated from Sofia University "St. Kl. Ohridski", Faculty of Biology in 1989 with a Master degree, specialist in biotechnological processes with a qualification “biotechnologist, specialist in biotechnological processes and technologies” in 1989 at the Department of Biotechnology. There, in 1996 she defended her PhD thesis. Assoc. Prof. Kenarova has almost 28 years of work experience at Sofia University, most of which are academic positions. She began his academic career in 1998 as a Senior Assistant in the Department of Ecology and Environmental Protection. A little later she became a Chief Assistant, and since 2010 she has been an Associate Professor in the same department. The career growth and the professional qualification of the candidate fully correspond to the topic of the announced competition for Associate Professor in the Department of Ecology and Environmental Protection.

### **Assessment of the applicant activity**

**Teaching activity.** The teaching activity of Assoc. Prof. Kenarova is high, including the implementation of various lecture courses and practical classes for students of various specialties, bachelor's and master's degrees at the Faculty of Biology at Sofia University. For the last five years, its average total and academic study employment is 578 and 466 hours, respectively.

Assoc. Prof. Kenarova conducts the lecture courses *Ecology and Environmental Protection*, *Ecological Monitoring (Bioindication with Microorganisms)* and *Waste Management* of students Bachelor's degree at the Faculty of Biology from specialties Biology, Ecology and Environmental Protection, Biomanagement and Sustainable Development, and the lecture courses *Ecology of Microorganisms*, *Ecology of Urban Systems*, *Waste Management*, *Air*

*Quality and Control* of students Master's degree from specialty Ecology and Environmental Protection.

Under supervision of Assoc. Prof. Kenarova 32 graduates have successfully defended their MSc thesis. She has a PhD student that has already defended her PhD thesis. Currently, she is supervising 1 PhD student at full-time education. In conclusion, I highly appreciate the overall teaching activity of Assoc. Prof. Dr. Anelia Kenarova, given its large volume and diversity.

**Research activity and achievements.** The main research profile of Assoc. Prof. Kenarova is in the field of ecology of microorganisms and their use as bioindicators to assess the impact of various pollutants on biological communities. They find expression in high publishing activity and development of numerous research projects. Assoc. Prof. Kenarova has 61 publications (scientific articles, published conference proceedings, 2 chapters of books), 1 textbook for students and 1 school workbook, mostly co-authored.

For the competition for the academic position "Professor" 20 scientific articles in peer-reviewed and indexed in WoS/SCOPUS journals, 2 published conference proceedings and two book chapters were presented. The papers were distributed in quartiles as follows: Q1 – 4, Q2 – 7, Q3 – 5, Q4 – 2. One of the papers does not have a Q but is indexed by SCOPUS. Five of the articles are included as equivalent to habilitation work. One of the two book chapters is published by the publishing house *Springer*. In 4 of the 20 scientific articles submitted for the competition and in one chapter of the book Assoc. Prof. Kenarova is the first, and in 11 articles she is the second co-author. In the remaining articles she takes third and next place in the author's team. The co-authorship in the scientific works shows close cooperation with a number of colleagues, specialists in the field. Assoc. Prof. Kenarova has also taken part in 31 scientific conferences - 14 international and 17 national.

Proof of the importance of Assoc. Prof. Kenarova's research is their citation. The candidate has 225 citations, the majority in publications referenced and indexed in Scopus and Web of Science, h-index: 7 (Scopus) and 9 (Google Scholar). The total impact factor of the scientific publications of Assoc. Prof. Kenarova is 20,558, and the impact factor for the period of the competition is 16,512.

The reference for compliance with the minimal state requirements in accordance with Art. 2b of the Act for the Development of the Academic Staff in the Republic of Bulgaria for Higher Education area 4. *Natural sciences, mathematics and informatics*, Professional area 4.3. *Biological sciences* indicates that the applicant research achievements fully fit and even exceed the stipulated criteria:

- Indicators of group A: PhD thesis 50 p. (min 50)
- Indicators of group B: monograph **102** p. (min 100)
- Indicators of group G: research articles **289** p. (min 200)
- Indicators of group D: citations **320** p. (min 100)
- Indicators of group E: projects **212.61** p. (min 150)

The research of Assoc. Prof. Dr. Anelia Kenarova is current and has scientific and applied value. The studies used modern and diverse methods of analysis. The review of the presented scientific papers gives me reason to assume that the personal contribution to the experiments and their analysis is not in doubt. I fully accept the report on the contributions of the works of Assoc. Prof. Kenarova.

The contributions are in several scientific directions: 1. *Impact of soil pollution with radionuclides and heavy metals on soil microbial communities*; 2. *Effect of fungicides on soil bacterial communities*; 3. *Ecosystem functions and ecosystem services*; 4. *Bacterial communities of extreme ecosystems*. Among the more significant contributions, according to the main scientific fields in which the candidate works, the following can be mentioned:

1. *Impact of soil contamination with radionuclides and heavy metals on soil microbial communities.*

By applying a set of modern methods of analysis - cultivation, metagenomic, epifluorescence microscopy, a direct relationship is established between the level of soil contamination with heavy metals and radionuclides and the abundance of soil bacterial communities, as well as changes in their structure. It complements the database with results from uranium mine areas in Bulgaria. Soil contamination with heavy metals and radionuclides has been confirmed to adversely affect the activity of soil dehydrogenases, and acidic and alkaline phosphatases. The knowledge about the negative effect of radionuclide and heavy metal pollution on the catabolic activity of soil and sediment bacterial communities is also enriched. Pollution with radionuclides and heavy metals has been shown to alter the functional profiles of soil/sediment bacterial communities, suggesting a permanent imbalance in the cycle of nutrients. At the same time, it is found that the change in the functional profiles of these communities under the influence of radionuclides and heavy metals is accompanied by a decrease in their functional diversity by clarifying the factors and direction of changes in the spectrum of bacterial catabolism.

2. *Effect of fungicides on soil bacterial communities*

The effects of one of the most commonly used fungicides in intensive agriculture - QuadrisR on the activity of soil enzymes were tested. Its negative effect on the catabolic activity and functional diversity of soil bacterial communities, as well as the possibility of creating resistance to this preparation was also studied. These contributions are of great importance for the protection and restoration of contaminated soils.

3. *Ecosystem functions and ecosystem services*

Based on studies on the type and quality of ecosystem services provided by agro-ecosystems in Bulgaria, as well as in model regions (South-West planning region), it is established that intensive agricultural development in Bulgaria reduces the capacity of agro-ecosystems to provide ecosystem services. At the same time, the maintenance of highland permanent meadows in the South-West planning region as the main land use approach preserves the biodiversity in the region and maintains a high level of ecosystem services.

4. *Bacterial communities of extreme ecosystems.*

Through the use of modern molecular methods (ARDRA) for the first time in our country the composition and the changes in bacterial diversity of Bubreka Lake and Okoto Lake from the cirque of the Seven Rila Lakes in time and seasonal aspect has been identified, as well as the main factors with controlling effect. It makes possible to understand the structure and

dynamics of pelagic microbial communities in alpine lakes. The soil bacterial communities on Livingston Island have also been studied. A good information base has been created for the characteristics of the soil microbial communities on the island.

Assoc. Prof. Kenarova has participated in 8 national and 3 international research and educational projects funded by various national and international funds and programs such as Research fund at the Ministry of Education and Science, the Norwegian Fund for Environmental Cooperation, the European Union's program for transnational cooperation "Balkans - Mediterranean Sea 2014 - 2020", etc. Assoc. Prof. Kenarova is the leader of 3 national projects. Her knowledge in the field of ecology and environmental protection makes her a desirable expert in assessing the impact of waste on the environment. Assoc. Prof. Kenarova has participated in the preparation of numerous environmental impact assessment reports and waste management programs. All this confirms her active scientific-organizational and expert activity as well as her ability to work in a team.

Assoc. Prof. A. Kenarova is also actively involved in administrative activities. She is currently the Deputy Dean of the Faculty of Biology, as well as the Head of the Department of Ecology and Environmental Protection.

### **Conclusion**

Based on the analysis of the overall teaching and research activity of Assoc. Prof. Dr. Anelia Kenarova, I consider that it fully meets the requirements for holding the academic position "Professor" under the Act for the Development of the Academic Staff in the Republic of Bulgaria for Higher Education area, The Regulations for its implementation, and the Regulations for the conditions and the order for acquiring scientific degrees and holding academic positions in Sofia University "St. Kl. Ohridski". Sufficiently convincing evidence for her high scientific and teaching activity is presented. As a member of the Scientific Jury of the announced competition, appointed by order No RD 38-611/15.12.2021 of the Rector of Sofia University "St. Kliment Ohridski", I give a positive assessment and recommend that the members of the Honorable Faculty Council of the Faculty of Biology vote positively for the election of Assoc. Prof. Dr. Anelia Kenarova in the academic position „Professor” in the professional field 4.3. Biological sciences (Ecology and protection of ecosystems - Ecology of microorganisms).

Prepared the statement:

(Prof. Daniela Nikolova)

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