

## OPINION

By **ASSOC. PROF. MARIYA BORISOVA IVANOVA**,  
Faculty of Chemistry and Pharmacy at Sofia University "St. Kl. Ohridski",  
Member of a Scientific Jury, appointed by Order № RD 38-61/24.01.2022 of the Rector of  
Sofia University

**REGARDIN:** on the competition for the occupation of the academic position " **Associate Professor**" in Higher Education Area 4 "Natural Sciences, Mathematics and Informatics", Professional field 4.2 "Chemical Sciences" (Radiochemistry) for the needs of the Faculty of Chemistry and Pharmacy at Sofia University "St. Kl. Ohridski", announced in the Bulgarian State Newspaper, vol. 103/December 26, 2021

Only one applicant has submitted documents for participation in the announced competition – **BOYAN RUMENOV TODOROV**, Head Assistant Professor in Faculty of Chemistry and Pharmacy at Sofia University "St. Kl. Ohridski".

### APPLICATION DATA

**Boyan Tododrov, PhD** presented all required documents in electronic form which are in accordance with the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB, ЗПАСРБ ), the Regulations for the application of the ADASRB, the Regulations for the terms and conditions for acquiring academic degrees and occupying academic positions at Sofia University "St. Kliment Ohridski" and the Recommended criteria of the Faculty of Chemistry and Pharmacy for acquiring scientific degrees and occupying academic positions at SU in professional field "Chemical Sciences", related to the procedure for occupying the academic position (AP) "Associate Professor. The submitted documentation provides comprehensive information about the research and teaching activities of Dr Boyan Todorov, on the basis of which this opinion has been prepared.

### BIOGRAPHICAL DATA, EDUCATION AND PROFESSIONAL EXPERIENCE

Boyan Todorov was born on 16.01.1978 in Ruse, Bulgaria. He has graduated with Master's degree in Chemistry (Inorganic and Analytical Chemistry), Sofia University "St Kliment Ohridski" with very good grades in 2001. In 2009 the High Attestation committee awarded him the educational and scientific degree "Doctor" (PhD) in the specialty 01.05.04. "Analytical chemistry" after a successful defense of his PhD thesis on the topic: " Determination and assessment of the distribution of radionuclides ( $^{137}\text{Cs}$ ,  $^{60}\text{Co}$  and  $^{241}\text{Am}$ ) in the environment "with scientific supervisor Prof. Romyana Djingova, Dr.Sci.

Boyan Tododrov has about 20 years of experience in the speciality and from 2002 to 2004 he worked at the Institute for Nuclear Research and Nuclear Energy at Bulgarian Academy of Sciences; from 2003 to 2007 he was PhD student at the Department of Analytical Chemistry, Faculty of Chemistry of SU "St. Kl. Ohridski". Since 2007 he has held the academic positions of Assistant (2007-2008), Senior Assistant (2008-2009), Head Assistant Professor (2010 - present) at the Faculty of Chemistry and Pharmacy of SU "St. Kl. Ohridski".

During the period 2010-2021, Dr. Boyan Todorov has completed a one-year post-doctoral and seven short-term specializations. Three specializations were at Max-Planck-Institut für Polymerforschung, Mainz, Germany (October 2014, May 2015, November 2016), three specializations at the University of Helsinki, Helsinki, Finland (August 2014, February

2015, February 2018) and post-doctoral position (August 2011 - August 2012) and one specialization in Universitat de Barcelona, Barcelona, Spain (June 2019).

During the period 2011-2020 the applicant presented a list of participations in 10 scientific projects funded by the Scientific Research Fund at the Ministry of Education and Science, the Scientific Research Fund at SU "St. Kl. Ohridski" and various Operational Programs. On two of the contracts, Dr. Todorov was a leader (2010 and 2019), which proves his team management skills.

From the attached reference it can be seen that Dr. Todorov meets the minimal national requirements under Art. 2b of the ADASRB, as well as the recommendation criteria of the Faculty of Chemistry and Pharmacy for holding the academic position of "Associate Professor".

## EVALUATION OF SCIENTIFIC AND TEACHING ACTIVITY

Dr Boyan Tododrov (*Scopus Author ID 55682578600*) has presented: a list of the full scientific publications (24 pieces) for his entire creative period, a list and copies of scientific publications for the participation in this competition (20 pieces) - scientific publications as a habilitation work (5 pieces) and scientific publications outside the habilitation work (15 pieces) and a list of the citations.

### Scientific publications

The full list of the scientific papers of Dr. Todorov contains 23 scientific publications, 11 (47.8%) of which are in are high – indexed (Q1 and Q2) international journals.

The noted citations at the time of submission of the documents for the competition of the candidate are 67 (referenced and indexed in Scopus editions) in total, and the scientific papers for the competition – 44. The index of Hirsch (h-idex) of Dr. Boyan Todorov, checked in the Scopus scientific information database without autocitations is 5 which indicates good quality of work and actuality of the solved scientific problems.

**Dr Boyan Tododrov** participates in the competition for AP "Associate Professor" with 20 scientific publications, which were not included in the thesis for "Doctor" degree (2009) The list of publications included 18 papers in referenced journals with impact factor and quartile, one paper in jurnal whiout a quartile and one chapter in a book. By quartiles (WoS and Scopus categorization) he has 3(15%) publications in Q1 (first quartile), 6(30%) publications in Q2 (second quartile), 4(20%) publications in Q3 (third quartile) and 5 (25%) publications in Q4 (fourth quartile) journals.

It should be noted that about 30% of the candidate's scientific publications are in the last two years. This is an indication of his active research during this period. Some of the articles and the chapter of the book are the result of scientific collaboration with scientists from foreign research institutes.

The scientific results of Dr. Boyan have be reported in 10 national and international scientific forums, three of which are plenary reports.

A careful review of the materials submitted to me for review gives me a reason to claim that there is no evidence of plagiarism in the scientific publications of Dr Boyan Tododrov and he fulfills the condition referred to in Article 29, Paragraph 1, Item 6 of the law.

### Main scientific and scientific-applied achievements of the applicant

The main scientific contributions, in the publications submitted for participation in the competition, are in three main scientific directions – radioecology, nuclear medicine and

archeometry. The focus is on a thorough study of the spread of radionuclides in the environment, their application as visualization agents and theranostic preparations. The scientific tasks decided by Dr. Todorov are topical and key in these areas and have an undeniable scientific and scientifically applied contribution. Its can be summarised as follows:

**Radioecology** - the scientific results in this scientific field are presented in 11 papers related to the study of the complex influence of many environmental factors (soil type, soil chemical composition, residence time, climatic values), changing the distribution of natural and artificial radionuclides (Am, Cs, Co, Th and U) in defined soil phases. The obtained results have an **important applied value** for the creation of adequate models for risk assessment and forecasting in a given ecosystem after possible radioactive contamination, which is a priority in radiochemistry.

Other **significant contributions** in this field are: the development of **innovative** radiochemical procedures focused on determining the total content of americium or its specific chemical form (Am<sup>3+</sup>) in natural waters; a procedure for recycling radioactive waste from the production of <sup>18</sup>F, each of which includes the generation of a minimum amount of secondary radioactive waste and the lowest possible dose load of the personnel involved. Modern analytical technologies (HPLC, ICP-MS, Gamma spectrometry) are used.

**Nuclear medicine** - the contributions of Dr. Todorov in this direction are presented in 6 scientific publications and have an original-applied character of importance in modern medical practice. The possibilities of different types of (radioactive and nano) materials suitable for the creation of theranostic drugs are presented. The possibilities of bifunctional compounds for radioimaging of bioactive molecules have been studied. The scientific contributions of Dr. Todorov in this direction are indisputable. One of the most significant contributions is the synthesis of two new bifunctional compounds (radioindicators) that bind specifically to polyoligopeptidase (POP) and iodine isotopes. The first biological evaluation of a radiolabeled POP inhibitor was performed and the potential of the POP enzyme as a possible biomarker for pharmaceutical purposes was confirmed.

The review paper "*Copper radiopharmaceuticals for theranostic applications*", Ahmedova A, Todorov B, Burdzhiev N, Goze C. *European journal of medicinal chemistry*. 2018 Sep 5; 157:1406-1425. DOI:<https://doi.org/10.1016/j.ejmech.2018.08.051>, Q1, focused on the latest achievements in nuclear medicine related to the diagnostic and therapeutic potential of five of the copper radioisotopes with medical application is of undeniable importance in theranostics in the era of personalization of medicine. The paper has been cited 19 times in papers published in reputable scientific journals in the last three years. This proves the relevance and importance of the scientific problem on which Dr. Todorov is working.

**Archaeometry** - the possibilities of X-ray fluorescence analysis for solving specific archaeometric problems are presented, described in detail in two publications. With these studies, Dr. Todorov has identified inaccuracies regarding the composition and dating of an artifact (ingot) from Cape Kaliakra.

### **Educational and pedagogical activities**

**The teaching activity** of Dr. Boyan Todorov is impressive, which includes:

- 4 mandatory lecture courses in the field of radiochemistry in the Bachelor's Degree for students of Faculty of Chemistry and Pharmacy, specialty Nuclear Chemistry, Radiochemistry and Radioecology;
- 5 full-time training in the field of radiochemistry and Instrumental Methods of Analysis I – all specialties of Faculty of Chemistry and Pharmacy, full-time training).

He has been the research supervisor of 17 successful graduate students.

This data shows the high quality standard of the teaching activities of applicant.

## CONCLUSION

The publications presented by the applicant are on the topic of the competition and represent original scientific achievements with significant contribution to radiochemistry, nuclear medicine and archeometry. Analyzing the applicant's scientific achievements, the relevance and perspective of the topics, active participation in research projects and active teaching, I think Dr Boyan Tododrov meets all requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB, ЗПАСРБ ), the Regulations for the application of the ADASRB, the Regulations for the terms and conditions for acquiring academic degrees and occupying academic positions at Sofia University "St. Kliment Ohridski" and the Recommended criteria of the Faculty of Chemistry and Pharmacy for acquiring scientific degrees and occupying academic positions at SU in professional field " Chemical Sciences ", related to the procedure for occupying the academic position (AP) "Associate Professor". On the basis of the above, I confidently give a **positive assessment** and recommend to the Honorable Scientific Jury to propose to the Faculty Council of the Faculty of Chemistry and Pharmacy at the Sofia University **to award to Doctor Boyan Rumenov Tododrov** the academic position of "**Associate Professor**" in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.2. Chemical Sciences (Radiochemistry).

March 12, 2022

Reviewer:

/Assoc.Prof. Mariya Ivanova, MD/