

OPINION

By Assoc. Prof. Bissera Pilicheva, PhD

Head of the Department of Pharmaceutical Sciences, Medical University of Plovdiv;

**Member of the Scientific jury, appointed by Order № 26P/D09/10.01.2024 by the Director of
Institute of mineralogy and crystallography - BAS**

REGARDING: Competition for the academic position “Associate Professor” in professional area 4.2. Chemical sciences, announced in State Gazette, issue 95/2023 for the needs of the Department of Structural crystallography and materials science.

The only candidate in the competition is Ch. Assistant Professor Rusi Ivanov Rusev, Ph.D. from IMC-BAS. To participate in the competition, the candidate has submitted a complete set of documents in accordance with the requirements of the Regulations for the conditions and procedures for acquiring scientific degrees and holding academic positions in the Bulgarian Academy of Sciences and in IMC-BAS. All documents have the necessary requisites and are duly certified, precisely formed and very well systematized, and in full compliance with the Act for the Development of the Academic Staff in the Republic of Bulgaria.

ANALYSIS OF THE CAREER PROFILE OF THE APPLICANT

Rusi Rusev obtained a master's degree in engineering chemistry at the University of Chemical Technology and Metallurgy - Sofia in 2017. In 2021, the candidate was awarded PhD degree in "Mineralogy and Crystallography" at IMC-BAS after defending a dissertation on the topic "Synthesis, structural characterization and antimicrobial activity of quaternary ammonium compounds".

The professional development of Ch. Assist. Rusev started in 2014 as a chemist at the Institute of Mineralogy and Crystallography - BAS. In 2021, after successfully passing the competition, Rusi Rusev took the position of "assistant professor" at IMC-BAS, and in 2022, the position "chief assistant professor".

The analysis of the applicant's biographical data shows that his career profile and professional development fully correspond to the announced competition for the academic position "associate professor" in professional area 4.2. Chemical Sciences (Structural Analysis and Physicochemical Characterization of Small Organic Molecules).

EVALUATION OF THE SCIENTIFIC WORK OF THE APPLICANT

Ch. Assist. Professor Rusi Rusev participates in the current competition with a scientific production that meets and even exceeds the minimum national requirements and those of IMC-BAS for holding the position "associate professor" (Table 1). The candidate has a defended dissertation on the topic "Synthesis, structural characterization and antimicrobial activity of

quaternary ammonium compounds", which covers the required 50 points under group of indicators A. Rusev Rusev has presented 4 scientific publications, which are equivalent to a habilitation thesis (100 points by indicator group B). All publications are in issues referenced and indexed in the global database Web of Science (Q1). 17 publications are included in indicator group D, of which 8 are full-text articles in journals with an impact factor. In 9 of the publications, the candidate is first or second author. The total number of points under indicator group D is 273, which significantly exceeds the required 220 points. A reference to the month of February 2024 shows that the scientific production with which the candidate participated in the competition was cited 66 times in referenced sources (not counting the self-citations of all authors), which brings a total of 112 points and exceeds the minimum requirement of 60 points by group of indicators D. The scientific activity of ch. Assistant Professor Rusi Rusev is funded by 6 scientific projects funded by the Scientific Research Fund of the Ministry of Education and Science. The results of the research work of Ch. Assistant Professor Rusi Rusev have been presented at 6 scientific forums in the country and abroad. The subject matter of the scientific reports overlaps that of the publications, which shows a systematic scientific development in the direction of the current competition.

Table 1. *Minimum national requirements under Art. 2b of Act for the Development of the Academic Staff in the Republic of Bulgaria for the academic position "Associate Professor" and indicators of the candidate Rusi Rusev*

Group of indicators	Minimum requirements	Applicant's indicators
A	50	50
B	-	-
C	100	100
D	220	273
Total	60	112

ASSESSMENT OF THE APPLICANT'S SCIENTIFIC CONTRIBUTIONS

The topic of Rusi Rusev's scientific works is in two main directions. A large part of the candidate's works are focused on the structural analysis and physicochemical characterization of organic molecules with a view to their application in medicinal chemistry. Synthesis, physicochemical characterization and investigation of the antitumor activity of a new class of Combretastatin A-4 derivatives by modification of the Wittig reaction was performed. Antiproliferative activity in vitro was established for the newly synthesized derivatives, and the type of interaction between ligand and protein target (tubulin-statmin complex) was determined by molecular docking. As a result of the conducted research, a promising chemical compound with antitumor activity and potential as a therapeutic agent has been deduced. Other scientific developments of the candidate are focused on the synthesis and structural characterization of a Thioflavin T homologous molecule as a more specific marker for the early diagnosis of Alzheimer's Disease and of a hybrid derivative of 2-methylcinnamic acid and amantadine, which has been studied in a model of the disease of Parkinson's in mice. Rimantadine and amantadine derivatives with potential antiviral action were also synthesized, as well as a polymorphic modification of bisacodyl with improved physicochemical and physicochemical properties for inclusion in solid dosage forms. The candidate is involved in the thermal characterization of casein-based nanoparticles as drug delivery systems for tolfenamic acid.

A significant share of the candidate's scientific output is occupied by publications aimed at fundamental scientific research, containing detailed structural analysis and physicochemical characterization of new hydantoin derivatives as a basis for the development of medicinal substances with applications such as anticonvulsants, antibacterial agents or as crosslinkers in the polymer industry. New acylpyrazolone analogues have been synthesized. The newly synthesized structures are characterized in detail, emphasizing the importance of X-ray structural analysis in the study of atomic structures and the spatial orientation of molecules in the crystalline (solid) state - an area in which the candidate demonstrates indisputable competence and expertise. A valuable contribution of the candidate is the application of powder and single-crystal structural analysis, thermal studies and spectroscopic methods in the description of more than 50 new crystal structures and reliable conclusions regarding the structure-activity relationship have been made.

The above undoubtedly proves the candidate's competencies in the field of synthesis of new structures with potential biological effects, which is an undeniable contribution to pharmaceutical science aimed at addressing the global challenges of socially significant diseases such as cancer, Parkinson's disease, Alzheimer's disease, etc.

CONCLUSION

Chief Assistant Professor Rusi Rusev is a specialist with a wide range of scientific interests and solid research experience. His research activity has a wide thematic scope and is focused on topical issues in pharmaceutical science. His scientific works contain valuable scientific and applied contributions. According to the materials and documents submitted to me for review, I believe that all mandatory indicators of the criteria to the current minimum requirements have been met, and some have even been significantly exceeded.

Based on my general assessment, I believe that Rusi Rusev meets all the requirements for holding the academic position "Associate Professor", reflected in Act for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for the conditions and procedures for acquiring scientific degrees and holding academic positions in the Bulgarian Academy of Sciences and in IMC-BAS".

In view of the above, I confidently give my **positive opinion** and propose to the esteemed Scientific Jury Ch. Assistant Professor Rusi Rusev to be elected to the academic position of "Associate Professor" in professional area 4.2. Chemical sciences (Structural analysis and physicochemical characterization of small organic molecules), department "Structural Crystallography and Materials Science".

25.03.2024
Plovdiv

Reviewer:
(Assoc. prof. Bissera Pilicheva, PhD)