

OPINION

by Academician Prof. Dr. Sc. Vassya Stefanova Bankova

Member of the scientific jury for the competition to fill the academic position of "Associate Professor" at the Institute of Organic Chemistry with Centre of Phytochemistry (IOCCP), BAS, in professional field 4.2 "Chemical Sciences," scientific specialty "Organic Chemistry," for the needs of the Laboratory "Organic Synthesis and Stereochemistry"

The only candidate participating in the competition for the academic position of "Associate Professor" - announced in the State Gazette, Issue 55 of June 16, 2026, and on the IOCCP-BAS website - Assistant Professor Dr. Ivaylo Momchilov Slavchev, IOCCP-BAS.

1. General overview of the procedure and the candidate

The set of materials submitted by Dr. Slavchev fully complies with the requirements of the Regulations for the Development of the Academic Staff at IOCCP and meets the criteria set by the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB) and IOCCP-BAS for the academic position of "Associate Professor."

The candidate participates in the competition with 16 publications; all in scientific journals indexed in global databases (Scopus and Web of Science) and were not included in his PhD thesis. Of these publications, 11 are in Q1 journals, 4 in Q2, and one in Q3. In indicator group B (130 points against a requirement of 100 points), 6 publications are presented (3 with quartile Q1, 2 with Q2, and one with Q3); in indicator group G (240 points against a requirement of 220 points) – 10 publications (8 with Q1 and 2 with Q2).

Dr. Slavchev has a total of 22 publications. There are 88 recorded citations of publications involving him (excluding self-citations), 40 of which have been selected for inclusion in the present competition. His h-index is 6 according to the Scopus database, excluding self-citations.

The candidate has provided data on participation in 13 projects, serving as the leader for 4 of them.

2. Evaluation of scientific and applied scientific activity

Dr. Slavchev's scientific activity and contributions lie in the field of organic synthesis, with a focus on medicinal chemistry (primarily antimicrobial compounds) and the preparation of new materials. The search for new antibacterial, antiviral, and antitubercular agents is of particular importance due to the growing resistance of pathogenic microorganisms to existing therapeutic agents.

The contributions are the result of interdisciplinary research, including international collaboration. The most significant ones are included in the habilitation summary and can be outlined as follows:

- **Research into new approaches for amide bond formation.** The research focuses on the direct amidation of unactivated esters with simple nucleophilic amines in the presence of a strong base; its primary objective is to determine the reaction's applicability and scope, as well as to demonstrate its potential for practical use. Two approaches were employed, utilizing the bases t-BuOK and n-BuLi. Of particular interest is the observed tolerance toward various functional groups (carbonyl, hydroxyl, nitro, and carboxyl), a feature highly beneficial for the transformation of complex molecules. Notably, the successful selective acylation of an aromatic amino group in the presence of an aliphatic amino group was demonstrated for the first time. Additionally, various phosphoramidates - compounds with diverse applications in agrochemistry and pharmaceuticals - were synthesized. Thus, the work holds practical significance, demonstrating that this method for synthesizing industrially valuable products offers a superior and more environmentally friendly alternative to traditional amide-coupling reagents. I highly appreciate this contribution; it is no coincidence that the relevant publication (B1), released in 2022, has already obtained 21 citations.
- **Synthesis and antiviral activity of novel diaryl ethers and their analogues.** Sixty new compounds were synthesized - diaryl ethers and their analogues containing sulfur and nitrogen, including N-heterocycles. The synthesis was achieved in a single step using modified literature procedures, resulting in good yields. *In vitro* screening for antiviral activity against human pathogens was conducted on the obtained compounds, and *in vivo* experiments were performed with the most promising ones. Three of the compounds showed moderate protective effects. It was determined that sulfur and nitrogen analogues of the diaryl ethers lack antiviral activity. (Publications B2 and B3).
- **Synthesis and biological activity of new compounds with a camphane skeleton.** Twenty new arylidene-camphors and 15 pyrimidines with a fused camphane skeleton were designed and synthesized. They were tested against reference and resistant strains of the tuberculosis pathogen *Mycobacterium tuberculosis*, as well as various pathogenic bacteria and fungi; their *in vitro* and *in vivo* cytotoxicity was also determined. Some of the tested substances showed significant activity against MRSA, three compounds demonstrated remarkable antifungal activity, and two others showed strong activity against *Escherichia coli*. Studies on the cytotoxicity and metabolic stability of the obtained compounds were also conducted. (Publication B4)
- **Anti- and pro-oxidant activity of semi-synthetic amides featuring a fenchane skeleton.** These antitubercular amides were synthesized in an earlier work involving the candidate. The fenchane skeleton is linked via an amide bond to cinnamoyl-like moieties. The anti- and pro-oxidant activity of the compounds was evaluated to assess their ability to either induce or counteract oxidation processes, given the latter's significance in tuberculosis treatment. The authors conclude that the presence of the

fenchane skeleton within the molecule, combined with a 1,3-benzodioxole fragment, positively influences activity, although the specific role of the amide function remains a matter of speculation. (Publication B5).

- **Design and synthesis of novel heavy metal sensors.** The structure-property relationship of a series of four naphthalimide-derived ligands was investigated for the selective detection of Hg(II) and Cu(II) ions. Incorporation of a dansyl moiety induces intramolecular electron transfer, resulting in the formation of two "dyad" systems capable of undergoing redox processes. Notably, Hg(II) detection proceeds via a rare chelation-enhanced fluorescence mechanism, overcoming the fluorescence quenching effect typically associated with heavy metal ions such as Hg(II). On the other hand, Cu(II) dyads demonstrate significant reduction of Cu(II) to Cu(I) in solution, driven by ligand-to-metal electron transfer, as convincingly demonstrated by EPR and XPS analyses; this redox transformation is the rate-limiting step for catalytic efficiency. These results hold practical potential for environmental monitoring and redox-sensitive catalysis.

Among the works listed under Category G, six are dedicated to investigating the pharmacological properties of substances synthesized with the candidate's involvement—primarily anti-tuberculosis and antiviral agents. These publications are the product of large research teams comprising pharmacologists, biologists, and pharmacists. Dr. Slavchev is the second author of three of them, reflecting his significant contribution to the research. The remaining four publications in Category G focus on the development of new materials, such as sensors, a CO₂ adsorbent, and OLEDs. Here, too, the research teams are large - as is typical for interdisciplinary studies - and Dr. Slavchev is the second author on one of these publications.

The prospects for the future development of Dr. Slavchev's research work are clearly outlined. Research into the synthesis and biological activity of new substances, primarily those with antimicrobial and antiviral properties, will be deepened, while existing collaborations with Bulgarian and international partners will continue. Plans are in place to expand photophysical studies of new ligands with potential applications as chemosensors, fluorescent markers, and functionalized nanomaterials. The synthetic functionalization of silicate nanomaterials - intended for CO₂ capture from waste gases and conducted in collaboration with colleagues from IOCCP - is emerging as a promising new direction.

Based on the materials provided, I am convinced that the candidate's personal contribution to the research presented is significant and indisputable. Unfortunately, I do not have any personal impressions.

3. Critical remarks and recommendations

I have no critical remarks regarding the candidate or the materials submitted. I do have a question: What has been the candidate's participation in scientific forums?

4. Conclusion

Based on the above, and on the complete set of competition documents, I believe that Assistant Professor Dr. Ivaylo Slavchev fully meets the requirements for the academic position of "Associate Professor," in accordance with the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations for the Application of the ADASRB, the Regulations for the Application of the ADASRB at BAS, and the Regulations of IOCCP-BAS.

His scientific output, scientific contributions, and overall professional activity characterize him as an established researcher in the field of organic synthesis with excellent skills for working in interdisciplinary teams. Having reviewed the materials submitted for the competition and analyzed their significance and the scientific contributions contained therein, I provide a positive assessment and recommend that the Scientific Jury propose to the Scientific Council of the Institute of Organic Chemistry with Centre of Phytochemistry (BAS) the appointment of Chief Assistant Professor Dr. Ivaylo Momchilov Slavchev to the academic position of "Associate Professor" at the Institute, in Professional Field 4.2. Chemical Sciences, Scientific Specialty: "Organic Chemistry."

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Opinion prepared by:

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