

REVIEW

of the documents submitted for participation in the competition for the occupation of the academic position "Associate Professor"

in the field of higher education 4. "Natural sciences, mathematics and informatics", professional direction 4.2. "Chemical sciences" and scientific specialty "Bioorganic chemistry, chemistry of natural and physiologically active substances", for the needs of the laboratory "Chemistry of Natural Compounds", Institute of Organic Chemistry with Center for Phytochemistry (IOCCP), Bulgarian Academy of Sciences (BAS) with a single candidate Assistant Prof. Dr. Tsvetelina Emilova Doncheva

By Prof. Vassya Stefanova Bankova, DSci, Corresponding Member of the BAS, Institute of Organic Chemistry with Centre of Phytochemistry, Bulgarian Academy of Sciences

In the competition for the academic position "Associate Professor", announced in the State Gazette, no. 102 of 8.12.2023, one candidate participates: Assistant Professor Dr. Tsvetelina Emilova Doncheva from the laboratory "Chemistry of Natural Compounds" at IOCCP-BAS.

General presentation of the procedure and the candidate

The candidate Dr. Tsvetelina Doncheva presented for the competition a total of 19 scientific communications, published after the defense of her PhD Thesis. Of these, 18 are in journals with an impact factor, including authoritative publications such as *PLoS ONE*, *Diversity*, *Biochemical Systematics & Ecology*. One work is a chapter of a book published by Springer. In 10 of the works, Dr. Doncheva is the first author, in 7 – second, and in two she is in a lower place. There are also 7 documented participations in international and 4 in national scientific forums. Twenty of her publications have been cited a total of 200 times, her Hirsch index is 7 (Scopus, no self-citations). According to my observations, this is a common value of this modern scientometric indicator of habilitation candidates in the field of chemistry in Bulgaria. She participated in numerous research projects and was the leader of three international projects funded by BAS.

Dr. Doncheva completed her higher education in 1998 at the University of Chemical Technology and Metallurgy, Sofia, and in 1999 she started working as a chemist at IOCCP-BAS. In the period 2005-2010, she prepared and defended her PhD

Thesis on the topic "Alkaloid composition of species from the *Datureae* tribe" as an independent doctoral student. Since 2010, she has been working as an Assistant Professor at the same Institute.

I have known Dr. Doncheva personally since she joined the IOCCP and I can characterize her as a competent, goal-oriented, hard-working researcher with an undoubted ability to develop.

General characteristics of the candidate's activities

Dr. Doncheva's scientific contributions are in the field of the chemistry of natural compounds, primarily the chemistry of alkaloids, which possess a variety of biological activities.

The alkaloid composition of rare and endemic plant species was studied [works B2, B3, G2, G5, G6, G8, G9, G10, G11, G12]. Thirty-four alkaloids were isolated from Bulgarian, Vietnamese and Mongolian species, 23 of which were discovered for the first time in the respective species, and 3 [works B2, D5] were newly discovered natural compounds. A significant contribution to alkaloid chemistry was the discovery for the first time of a dimeric alkaloid containing a benzyltetrahydroisoquinoline moiety linked to 3,4-dihydroisoquinoline, as well as of an aporphine-benzylisoquinoline alkaloid in which the two parts of the molecule are connected by two ether bridges, the linkage being "head-head" and "tail-tail" [work B2]. The data on the alkaloid composition of the studied species are skillfully applied to deduce chemotaxonomic relationships [works B1, B4, B5, B6, D1, D4]. Studies on the alkaloid composition of *in vitro* cultivated and *ex vitro* adapted endemic plants are also of interest [works G3, G7]. In collaboration with various scientific groups, research has been conducted on the biological activity of isolated compounds and alkaloid mixtures, and many of them have been found to have valuable biological actions, such as antimicrobial, immunomodulatory, anti-inflammatory. I highly appreciate the candidate's participation in the broad team that studied the pro-oxidant and antimicrobial effects of TiO₂ nanoparticles in combination with talicarpin isolated from Bulgarian *Thalictrum minus* [work D6]. The interdisciplinary nature of research is an important positive feature of the candidate's work.

The remaining contributions can be attributed to the "Miscellaneous" group, they are indicative of Dr. Doncheva's diverse interests: research on the triterpene composition

of the species *Gentiana cruciata* L. [work D9] and on the composition of skin secretions of amphibian species *Triturus ivanbureschi* [work D11].

In general, the habilitation report is successfully prepared and structured and adequately reflects the goals and results of the research conducted. An important merit of the report is the inclusion of guidelines for the candidate's future research work, again emphasizing the importance of interdisciplinary research.

Based on the above, I believe that the candidate's scientific contributions can be characterized as new to science and enrichment of existing knowledge. These contributions also have significant potential for practical application in the future, especially in view of the ever-increasing interest in the use of natural compounds in pharmacy.

Critical remarks and recommendations

I have no substantive objections to the materials presented.

CONCLUSION

Everything said above characterizes Dr. Doncheva as an established researcher with her own profile in the field of research on alkaloids and a worthy successor of the excellent traditions of IOCCP in this field. The production presented for participation in this competition meets the quality and quantity of the requirements for the occupation of the academic position "Associate Professor" of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) and of IOCCP - BAS. The nature, scientific value and volume of the candidate's scientific contributions give me reason with deep conviction to recommend to the honorable members of the Scientific Jury to vote positively for the awarding of assistant professor Dr. Tsvetelina Emilova Doncheva the academic position of "Associate Professor" at the IOCCP - BAS.

April 2024, Sofia

Reviewer: