

REPORT

on the competition for the academic position "Associate Professor"
in professional field 4.2. Chemical sciences, specialty "Processes and apparatuses in chemical and
biochemical technology" for the needs of the laboratory "Transfer Processes in Multiphase Media"
at the Institute of Chemical Engineering of Bulgarian Academy of Sciences (IChE-BAS),

with candidate Assist. Prof. Diana Ivanova Ivanova, PhD

Member of the scientific jury: Prof. Daniela Boyanova Dzhonova-Atanasova, PhD
from IChE-BAS

1. General characteristics of the candidate's scientific and scientific-applied activity

Scientific and applied research activity of the candidate Dr. Diana Ivanova Ivanova is related to development of ecological methods for obtaining plant extracts; optimizing the conditions for extracting bioactive natural substances from plant raw materials; analysis of antioxidant activity of plant extracts; analysis of apoptosis induced by cytotoxic substances in cancer cells by liquid cytometry, Western blot analysis, etc.; cultivation and treatment of cancer cell lines with cytotoxic substances.

The total number of scientific works of the candidate, including those presented in the competition, is 21 scientific articles. Of them, 20 are in journals, cited and indexed in the world databases Web of Science and Scopus.

The candidate participates in a number of scientific projects for development of new ecological technologies for obtaining plant extracts with optimized bioactivity and analysis of antitumor, antioxidant, antibacterial activity of natural products, among which participation in a project financed by Bulgarian National Science Fund, management of the project in agreement with Arnold Arboretum, Harvard University, Boston, USA, and project management under "Erasmus plus" program between BAS and Medical University, Lublin, Poland. She had 3 long-term (1 - 5 year) specializations with scholarships under international agreements in France, Spain and Russia and multiple grants for short-term specializations and participations in conferences abroad.

The candidate has a teaching activity in the period 2007-2008 at the Private high school "Evrostar", Sofia on "Chemistry" and "Man and Nature".

2. Evaluation of the presented materials

A total list of 21 publications is presented in the competition materials. Of these, 17 publications are presented in the current competition, of which 16 are articles in journals with quartiles. The distribution by quartiles is as follows: 9 in Q1, 1 in Q2, 2 in Q3, 4 in Q4. The significant

share of articles of the highest category Q1 is impressive. This speaks for their high quality due to the high requirements of the journals and their reviewers. I highly rate the presence of 9 articles in Q1, which make up 56% of publications with quartiles. Only 1 article in a journal outside the world databases is presented, which does not carry points, but contributes to the fulfillment of the requirements of IChE-BAS for the number of publications in the competition. The remaining 4 publications from the list of all publications are outside of this competition and are related to the PhD dissertation. They participate in covering the condition for the total number of articles according to the regulations of IChE-BAS. They all are of Q1 quartile. By all indicators, the requirements are met and some are exceeded, those of the law and the regulations of BAS, as well as the regulations of IChE-BAS.

For the period after the defense of the PhD dissertation, Dr. Ivanova has published 17 articles, with a notable activity in 2018, when she has 3 publications. Quantitatively, I rate this performance as very good.

3. Basic scientific and scientific-applied contributions

I accept all scientific and applied contributions presented in the candidate's reference. The most significant ones can be characterized as enrichment of existing knowledge and theory, as follows.

Habilitation work- 4 articles

- Obtaining bioactive plant extracts and optimizing the conditions for extracting biologically active substances from natural raw materials. Bulgarian and foreign conifer species are identified and distinguished for the high content of podophyllotoxin and therefore effective antiproliferative activity of their extracts, which have potential application in pharmacy as an alternative natural source for the extraction of precursors for the industrial synthesis of antitumor substances.

- Investigation of the mechanism of activity of synthesized analogues of natural substances with optimized bioactivity. The investigated analogues of the natural substance retinoic acid, namely synthetic silicon-based arotinoids, represent potential model compounds for the design of new antitumor drugs.

Contributions not included in the habilitation work- 13 articles

- Obtaining plant extracts with high bioactivity and optimized content of bioactive substances. The extraction process is optimized in order to achieve maximum yield of the selected bioactive component and antioxidant activity while optimizing process parameters: solvent selection, temperature, solvent/raw material ratio and process duration under conditions of mass exchange intensification by stirring.

- Preparation of synthetic analogs of natural substances as ligands of bioactive proteins. New retinals, analogues of the natural substance retinal (vitamin-A-aldehyde), were synthesized and spectrally characterized as potential ligands for the preparation of bacteriorhodopsin analogues.

-Application of metronomic therapy with cytostatic agents of plant origin or synthetic antimetabolites in combination with hormone therapy in clinical trials. It has been confirmed that chemoendocrine metronomic therapy in advanced stages of breast cancer leads to rapid long-term remission without significant toxicity or other side effects of the therapy.

The significance of contributions to science and practice: The contributions of the candidate's scientific works are scientific and applied, with an emphasis on applied science, which corresponds to the applied nature of the topic of the competition.

Personal contribution of the candidate and the vision for the development of the competition topic over the next 5 years:

There is no doubt that the contributions are the candidate's individual efforts in equal cooperation with the co-authors.

The scientific topics are significant and promising for continuation of research in this field during the upcoming work of the candidate on the competition topic in the next 5 years.

4. Reflection of the candidate's scientific publications in Bulgarian and foreign literature

The number of citations, which many times exceed the requirements, speaks for the candidate's authority in the scientific community in Bulgaria and abroad. The citation in the world databases of the candidate's publications is impressive, reaching over 240 citations (information from Scopus) for the entire publication period, of which 50 citations are presented in the current competition, which significantly exceeds the requirements for this indicator. According to Scopus, the candidate has an impressive H- index of 8 (4 recommended).

5. Personal impressions of the candidate

I have known the candidate since she joined IChE-BAS. She combines persistence and determination in work with excellent organizational skills. She has made an impressive number of international contacts and maintains successful cooperation with colleagues from all over the world. I think her professional and personal qualities will be of significant benefit to the development of the topic of the competition.

6. Critical notes and recommendations

I have no critical comments on the presented materials.

CONCLUSION

All quantitative and qualitative indicators for evaluating the candidate's research and academic activity correspond, and some significantly exceed the requirements for holding the academic position "Associate Professor".

The minimum requirements of the Law for Development of the Academic Staff, also these of the Bulgarian Academy of Sciences and the Institute of Chemical Engineering have been met and exceeded.

Based on the careful examination of the presented scientific works, their significance for science and practical application and the contributions in them, I propose Assist. Prof. Dr. Diana Ivanova Ivanova to acquire the academic position "Associate Professor" in professional field 4.2. Chemical sciences, specialty "Processes and apparatuses in chemical and biochemical technology" at IChE-BAS.

Date: 17.11.2023

Member of the scientific jury:



(Prof. D. Dzhonova-Atanasova)