OPINION

from Atanas Ivanov Pavlov, DScTech – Full Professor at the University of Food Technology – Plovdiv; Professor at the Institute of Microbiology, Bulgarian Academy of Sciences (BAS); Corresponding Member of BAS

on the competition papers

for the academic position of **Associate Professor**

at the Institute of Organic Chemistry with Centre of Phytochemistry (IOCCP), BAS

higher education area **4.2. Chemical Sciences**

professional area **Bioorganic Chemistry, Chemistry of Natural and Physiologically Active Substances**

Dr. Boryana Stoykova Trusheva, Senior Assistant Professor at IOCCF-BAS, Laboratory of Chemistry of Natural Substances, is an applicant to the position of associate-professor and participant in the competition advertised in State Gazette No 43 of May 31, 2019, and on the website of the Institute of Organic Chemistry with Centre of Phytochemistry (IOCCF), BAS.

1. Overview of submitted competition documents

One candidate has lodged papers for participation in the competition: Dr. Boryana Stoykova Trusheva, currently Senior Assistant Professor at the Laboratory of Chemistry of Natural Substances, IOCCP-BAS.

The documents submitted by Dr. Trusheva complies with IOCCF Rules on Academic Staff Development and meets IOCCF-BAS eligibility criteria to occupy the academic position of Associate Professor.

The candidate, Dr. Boryana Stoykova Trusheva, has submitted a total of 35 scholarly works, three of which are published research studies (equivalent scholarly works according to the Act for Academic Staff Development in the Republic of Bulgaria), 29 scientific publications, two chapters of co-authored monographs (books), one defended utility model and a list of 17 research works, of which 11 research projects and six scientific projects funded by business entities. Twenty-eight scholarly works unrelated to the dissertation are accepted for review and will be included in the final assessment, as well as 11 research projects. Five scholarly works based on the dissertation, and two scholarly works published prior to the competition for Senior Assistant Professor will not be reviewed. The scholarly works are distributed according to the relevant Q-factor as follows: Q1- 8; Q2 - 9; Q3 - 3.

Short biography of the candidate

Senior Assistant Professor Dr. Boryana Trusheva holds a Master's Degree in Organic and Analytical Chemistry from the Faculty of Chemistry of Sofia University “Kliment Ohridski”. In the period of 2003-2006, she was a PhD student at the Institute of Organic Chemistry with Phytochemistry Centre at BAS, where she successfully defended and was awarded the academic and scientific Doctor degree. Her work experience is closely linked to IOCCF-BAS, occupying successively the positions of Specialist-Chemist (2006-2007) and Senior Assistant Professor (2007 until the present).

I do not know the candidate and therefore have no personal impressions of her.

2. General characteristics of candidate's work

Assessment of candidate's scientific and applied research work

The scientific production of Dr. Boryana Trusheva after occupying the position of Senior Assistant Professor consists of 27 scholarly works and one utility model, evidencing her active and successful work in the field of chemistry of natural substances. The scholarly works submitted within the framework of this competition reveal her as a scientist actively involved in research work. The number of scientific publications and their distribution as presented above meet the IOCCF-BAS criteria for conferral of the academic position of Associate Professor. All of the submitted scholarly works are in the field of chemistry of natural substances. The specific areas of scientific interest of Dr. Trusheva can be summarized as follows:

- Chemistry and biological activity of propolis from honey bees and stingless bees;

- Chemistry and biological activity of organic structures from tree fungi.

The main contributions of Dr. Boryana Trusheva's intensive research work can be attributed to the following groups: novelty in science, supplementing scientific knowledge, methodological and applied:

- Novelty in science:

= For the first time, the presence of the prenylated coumarin suberosin and terpene esters tschimgin (bornyl-p-hydroxybenzoate), tschimganin (bornyl vanillate), ferutinin (ferutinol p-hydroxybenzoate) and tefernin (ferutinol vanillate) was demonstrated in propolis (origin Iran, Isfahan province);

= For the first time, the species of *Macaranga tanarius* L. and *Mangifera indica* L. (mango) have been identified as plant sources of Indonesian propolis;

= Two novel propolis components have been isolated and identified: acetylated daucane esters of p-methoxy and p-hydroxybenzoic acids;

= Two new prenylated stilbenes with an irregular sesquiterpene side chain, solomonin B and solomonin C, have been isolated from propolis originating from Fiji;

= Four new cycloartane triterpenes have been isolated: 3-oxo-cycloart-24E-en-21,26-diol-21,26-diacetate, 3-oxo-cycloart-24E-en-21,26-diol, 3-oxo-cycloart -24E-en-21,26-diol-21-acetate, and 3-oxo-cycloart-24E-en-21,26-diol-26-acetate from propolis originating from the Pitcairn Islands.

= In the study of the profile of secondary metabolites of *Fomitopsis rosea*, two new natural triterpenes- lanostanoic acids were isolated and characterized.

- Supplementing scientific knowledge:

= Activity of propolis components against *Paenibacillus larvae* has been demonstrated, identifying them as potential antimicrobial agents against bee pathogens;

= Based on an analysis of the composition of propolis from the Perm region, the formulation of a new, specific type of propolis of triple plant origin of *Populus tremula, Betula pendula* and *Populus nigra* has been established.

= Geopropolis (origin: Brazil, state of Maranhão) has been shown to possess antitumor and immunomodulatory activity. In combination with chloramphenicol, it also exhibits a synergistic antimicrobial effect against *Staphylococcus aureus* and *Escherichia coli;*

= The major volatile components in the essential oil of Brazilian red propolis have been found to be the phenylpropanoid elemicin, methyl eugenol, trans-methylisoeugenol, isoelemicin and trans-anethole, and in Taiwanese green propolis essential oil are β-eudesmol, 6-methyl-3,5-heptadien-2-one, γ-eudesmol, geranial and 6-methyl-5-hepten-2-one;

= 5α, 8α-epidioxy-24(ξ)-methylcholesta-6,22-diene-3β-ol was isolated from *Hygrophorus agathosmus*. It has been argued that its presence is probably an artefact obtained by oxidation of the corresponding $\Delta^{5,7}$ sterol.

- Methodological:

= A methodological platform has been developed for the extraction of biologically active substances from propolis. The efficiency of ultrasonic and microwave extractions in terms of yield, extraction time and selectivity was evaluated;

= First-time successful implementation of dead-end nanofiltration as a method for concentration of biologically active substances extracted from poplar propolis.

- Applied:

= A new water-soluble form of poplar propolis has been developed based on biocompatible poly(ethylene oxide)-block-poly(propylene oxide)-block-poly(ethylene oxide) block copolymer (PEO26PPO40PEO26), with the composition of this water-soluble form being registered as a utility model;

= Silver-modified MCM-41 and SBA-15 mesoporous materials have been demonstrated for the first time as suitable carriers of poplar propolis.

The contributions listed above, as well as the scientometric indicators of the scientific production presented (over 1200 citations, impact factor – 59.767 only of the publications relating to the competition, h-index 15) identify Dr. Trusheva as a recognized scholar among the members of the international college within her area of competence, who is prepared to formulate scientific questions and organize their solution.

This good scientific production would not have been possible without the comfortable funding of the research work. In this regard, Dr. Trusheva's indicators can also be defined as good - she has been a member of a scientific team in 11 projects, four of which international. Dr. Trusheva has also participated in six projects funded by businesses.

Qualitative assessment of candidate's educational and pedagogical work

Dr. Trusheva's teaching work is properly documented and involves guidance for graduate students and trainees.

3. Critical comments and recommendations

My critical remarks concern the lack of documented conference reports and peer reviews of articles published in scientific journals. This could be a technical omission, since the scientific output presented implies considerable activity in these two very important areas of scholarly work.

CONCLUSION

The documents and materials submitted by Senior Assistant Professor Boryana Stoykova Trusheva comply with all the requirements of the Law on Academic Staff Development in the Republic of Bulgaria (ZRASRB), the Rules for the Implementation of ZRASRB, the Rules for the Implementation of the ZRASRB of BAS, and the Rules of the IOCCF-BAS.

The candidate has submitted a sufficient number of scholarly works published later than the materials included in the defence of the doctoral degree and in the Senior Assistant Professorship competition. The candidate's work comprises original scientific and applied contributions that have received international recognition, a representative part of which has been published in journals and scientific compendiums published by international academic publishers. Her theoretical developmental work has practical applicability. Dr. Boryana Stoykova Trusheva's scientific qualification is beyond doubt.

The results achieved by Dr. Boryana Stoykova Trusheva in her research fully comply with the specific requirements of the IOCCCF-BAS Regulations for the application of ZRARB.

Having acquainted myself with the materials and scholarly works submitted in relation to the competition, the analysis of their importance and scientific and applied contributions contained therein, I consider it should be legitimate to give my positive opinion and to recommend that the Scientific Jury prepare a report to the Scientific Council of IOCCF-BAS regarding the appointment of Senior Assistant Professor Boryana Stoykova Trusheva as Associate Professor at IOCCF-BAS in the higher education area of 4.2. Chemical Sciences (Bioorganic Chemistry, Chemistry of Natural and Physiologically Active Substances).

10. 09. 2019

Opinion prepared by: .....

(Cor. Mem. Prof. Atanas Ivanov Pavlov, DScTech)