ATTITUDE OF REVIEWER

by Dr. Ira Valkova Stancheva - Professor at the Institute of Plant Physiology and Genetics - BAS of the materials submitted for participation in the competition for the occupation of the academic position of 'Professor' at the Institute of Organic Chemistry with the Center of Phytochemistry (IOCCF), BAS

in the scientific specialty "Bioorganic chemistry, chemistry of natural and physiologically active substances", professional field "Chemical sciences"

In the competition for the academic position of 'Professor', announced in the Newspaper of State, issue 43 of 31.05.2019 and on the website of IOCCF-BAS, participate: Associate Professor Milena Petkova Popova, PhD, Institute of Organic Chemistry, Center for Phytochemistry, Bulgarian Academy of Sciences

1. General presentation of the procedure and the applicant

The set of materials presented by Assoc. Prof. Milena Popova is in accordance with the Regulations for the Development of the Academic Staff of IOCCF, and meets the criteria of IOCCF-BAS for occupying the academic position of "Professor". Dr. Popova has applied a total of 79 scientific works, of which 64 in refereed editions and 4 book chapters. For review, 35 non-dissertation papers are accepted for final evaluation and 9 research projects after 2014, when she acquired the academic position of associate professor. 44 scientific papers are not reviewed. The distribution of scientific papers according to the relevant Q factors is as follows: Publications on indicator B - 8 issues, of which with Q1-1, Q2-5 and Q4-2. Publications on indicator G - 27 issues, of which in journals with Q1-10, Q2-10, Q3-3, Q4 -2. Two book chapters and one registered useful model are presented.

Associate Professor Dr. Milena Popova graduated from the Faculty of Chemistry at Sofia University “St. Kliment Ohridski ", speciality “chemistry and physics” in 1998. In 2000 she enrolled in a PhD in self-study at the Institute of Organic Chemistry with a Phytochemistry Center. In 2004 she defended her PhD thesis on title "Chemical composition and biological activity of propolis from different geographical regions and species of bees", and was awarded the educational and scientific degree "Doctor". In the period 2004-2014 she worked as a "assistant professor" and from 2014 until now she has held the academic position of "associate professor". Her main scientific interests are in the field of bio-organic chemistry, chemistry of natural and physiologically active substances, which coincides with the theme of the announced competition.

2. General characteristics of the applicant's activities

The submitted publications for participation in the competition, with the exception of the two book chapters, are in refereed international scientific journals with an impact factor and have

three or more co-authors. In 8 of these publications, Dr. Popova is the first author, and in 10 - the second. The scientific contributions of Assoc. Prof. Dr. Milena Popova are in two main scientific areas: Propolis Research and Medicinal Plants Research.

The first area includes the study of the chemical composition and biological activity of propolis from different geographical areas and species of bees, and the identification of its plant sources, as well as the summary and analysis of data on propolis. This area includes the applicant's main research activity.

Over 20 types of propolis have been formulated, classified into three main groups - propolis from areas with temperate, subtropical and tropical climates. Propolis from temperate regions are reflected in publications 2B, 4B, 5B, 6B 5G, 9G, 19G. For the first time, the specific quantitative characteristics of a series of samples from Bulgaria were investigated. Twenty-two samples from different regions were analyzed and spectrophotometric procedures were applied to quantify groups of components after their poplar origin was proven. According to the results, the characteristics that guarantee the good quality of raw propolis in terms of minimum content are proposed. The higher values of biologically active substances obtained: balm, propolis tincture, total phenols, general flavones and flavonols, and total flavones and dihydroflavonols of the minimum values, approved by the International Honey Commission and show that Bulgarian propolis is a product of high quality (4B). The proposed criteria can be used as a basis for standardization of Bulgarian propolis with a view to introducing science-based ISO standards. The chemical composition, antioxidant and antimicrobial activity of 32 samples from the Mediterranean region were studied: Greece, Cyprus, Croatia and Algeria. GC / MS analyzes identified over 150 compounds characteristic of Mediterranean (diterpene, Cupressus sempervirens) and poplar type (P. nigra) propolis. Propolis from Oman and the Fiji Islands and Pitcairn Islands were first investigated and their chemical composition was demonstrated by GC / MS profiling. The chemical composition of propolis from different regions of Colombia by GC / MS. A high relative content of benzophenones, mainly nemozoron, has been found to lead to higher antiradical activity and cytotoxic action against osteosarcoma cells (26G).

Propolis summary data are presented in review papers published in scientific journals and books. (1G), (3D), (10G), (11G), (15G), (23G), (25G).

For the first time, information on the application of propolis in new and promising areas and innovative products has been summarized. The analysis showed that propolis has the potential to be used as a growth enhancer in animals, a food preservative, food storage packages, textile materials for medical use, and more. (11G). It has been shown that, despite the wide spectrum of biological action of propolis, no clinical trials have yet been conducted, the main reason being its

poor solubility in water, which is being addressed in the framework of the NSF project, DN09/1 (25 G).

The second research field includes studies on the chemical composition and biological activity of medicinal plants, as reported in publications 2G, 4G, 13G, 18G, 20G, 27G. The chemical composition of Bulgarian celery (Apium graveolens), a popular vegetable and medicinal plant, has been investigated. The total phenolic and flavonoid content of leaf extracts and celery root collected from 19 sites in Bulgaria was investigated. The study showed that the roots and leaves of Bulgarian celery are a rich source of biologically active ingredients (2G).

The chemical composition of the mother plant and the transformed root culture of mullein *Verbascum eriophorum*, a poorly studied and rare species, were analyzed in the framework of a project with the NSF (DNI B02 / 14). Nineteen components (organic and amino acids, carbohydrates, phenolic components and iridoid glycosides) have been identified, of which iridoid glycosides (harpagoside, auccin and its derivatives) were found only in the leaf mass of the mother plant, whereas in the genetically transformed root crops phenylethanoid glycosides, the main of which is verbascoside, known for its valuable pharmacological properties, such as anti-inflammatory and cytoprotective. From the methanolic extract of the aboveground parts of the endemic species *Verbascum nobile* Velen collected from the Rhodopes near Asenovgrad, 2 newly discovered iridoid glycosides were isolated, along with 9 known components characteristic of the genus *Verbascum.*

The first study was conducted to discover the relationship between chemical composition - biocogical activity (antimcrobic and anti radical activities) from extract of roots of aboveground parts of *Geum urbanum* L. From the ethyl acetate root extract, the highest antimicrobial activity was obtaned mainly against gram-positive bacteria and high antiradical activity, 7 components were isolated, of which 2 new for the genus and 3 new for the species.

The applicant's plans for the future work are again in the field of Chemistry of natural substances and relate to his scientific interests and competence in the implementation of current and future projects.

A total of 2358 citations were noted, and after filling the academic position of associate professor - 1 529, of which in refereed and indexed journals and collective volumes (according to Web of Science and / or Scopus) - 1 172, in non-refereed editions and dissertations - 357 (in non-refereed journals and books - 224, in dissertations - 133). h candidate index - 18.

Dr. Popova has participated in 8 international and 9 national projects and has been the leader of 2 national projects. She has participated in over 20 international conferences and has been a member of the Scientific Committee at 4 international conferences. Milena Popova has a serious activity in scientific and educational activity. She has been the head of two and a consultant to

four graduates. She was also a consultant to a successfully defended PhD student. She has participated in the training of PhD and PhD students from Malta and Thailand.

CONCLUSION

The documents and materials presented by Assoc. Prof. Milena Petkova Popova meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the implementation of the ZRASRB, the Regulations for the implementation of the ZRASRB of BAS and the Regulations of IOCCF-BAS. The candidate submitted a sufficient number of scientific papers published after the materials used in the defense of the Doctor degree and the acquisition of the associate professor's academic degree. The candidate's works contain in-depth original scientific and applied scientific contributions, as a significant part of them are published in journals and book chapters published by international academic publishers. After getting acquainted with the materials and scientific works presented in the competition, analysis of their importance and the scientific and applied contributions contained therein, I give my positive assessment and recommend to the Scientific Jury to prepare a report - proposal to the Scientific Council of IOCCF-BAS for selection of Assoc. Prof. Milena Petkova Popova in the academic position of 'Professor' at IOCCF-BAS in the professional field 'Chemical Sciences' and scientific specialty 'Bioorganic chemistry, chemistry of natural and physiologically active substances'.

09.09. 2019 Signature: ....

Prof. Dr. Ira Stancheva

(name of family name)