REVIEW

On the Materials of Assoc. Prof. Vanya Nikolova Mantareva for obtaining the **academic position of PROFESSOR** in the professional field 4.2. Chemical Sciences, scientific specialty 01.05.10 Bioorganic Chemistry, Chemistry of Natural and Physiologically Active Substances, for the needs of the lab. "HBPE", announced by the IOCCF-BAS in State Gazette issue 40 of 16.05.2025

From prof. Tsonko Mitev Kolev, PhD, DSc Institute of Molecular Biology "Acad. Rumen Tsanev". BAS Sofia

For participation in the competition, Associate Professor Doctor of Sciences Vanya Nikolova Mantareva has presented the following documents:

1. Scientific curriculum vitae according to the European standard. 2. Reference according to a template for the fulfillment of the criteria of the IOCCF-BAS for occupying the academic position of "Professor" (excell.xlsx & pdf). 3. Diploma for acquiring the educational and scientific degree of "Doctor". 4. Diploma for the acquisition of the scientific degree "Doctor of Science". 5. Diploma for awarding the academic position of "Associate Professor" 6. Abstract of a dissertation for the acquisition of the educational and scientific degree "Doctor". 7. Abstract of the dissertation for the acquisition of the scientific degree of "Doctor of Sciences". 8. Habilitation extended reference for scientific contributions and prospects for scientific research. 9. Habilitation extended reference translated into English. 10. List of all scientific papers, with a distinction between the publications for participation in the competition. 11. List of publications participating in the competition as an equivalent number of articles for habilitation work, which do not repeat those submitted in other competitions for occupying academic positions and acquiring scientific degrees (indicator C). 12. List of publications participating in the competition under indicator group D (Appendix 1), which do not repeat those submitted in other competitions for occupying academic positions and acquiring scientific degrees. 13. List of citations that do not repeat those presented in other competitions for occupying academic positions and acquiring scientific degrees. 14. Information about the guidance of a doctoral student, with evidence. 15. List of participation in scientific conferences. 16. Information about participation in research projects. 17. Copies of the publications participating in the competition as an equivalent number of articles for habilitation work, which do not repeat those submitted in other competitions for occupying academic positions and acquiring scientific degrees (indicator C). 18. Copies of the publications participating in the competition under group of indicators D (Appendix 1), which do not repeat those submitted in other competitions for occupying academic positions and acquiring scientific degrees. 19. Evidence material for participation in scientific forums. 20. Evidentiary material for management and participation in projects and contribution to transferred funds. 21. ***Eight electronic media***, containing one separate PDF file for each of the above-mentioned documents and folders with the evidence material according to the lists.

Briefly some biographical data about the candidate:

Name MANTAREVA, Vanya Nikolova
Address: H. Dimitar, 138 Zlatitsa Str., B, Sofia, 1510, Bulgaria Phone **+ 359 895 286 990**
Fax
E-mail Vanya.Mantareva@orgchm.bas.bg; mantareva@yahoo.com
Nationality Bulgarian

WORK EXPERIENCE 33 years

• Dates (from-to) 20.03.2014 – PRESENT • Name and address of the employer Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences Ul. "Acad. Georgi Bonchev", bl. 9, 1113 Sofia, Bulgaria • Type of activity or field of work Research in the field of natural sciences

• Position Associate Professor • Main activities and responsibilities Conducting research, supervising a PhD student, project management, publication of scientific results, reports at international forums

• Dates (from-to) **2005 – FEBRUARY, 2014 •** Name and address of the employer Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences Ul. "Acad. Georgi Bonchev", bl. 9, 1113 Sofia • Type of activity or field of work Scientific research • Position held Chief Assistant (researcher I class) • Main activities and responsibilities Independence in research work; preparation of graduates; publication of results in scientific journals and their presentation at scientific forums

• Dates (from-to) **1999 - MAY, 2003**

CONSECUTIVELY AS A SCHOLARSHIP HOLDER IN:

• Name and address of the employer 1. Institute of Macromolecular Chemistry, University of Bremen, Bremen, Germany (Prof. Dieter Wörle); 2. University of Lewisville, James Brown Cancer Center, Sofia. Louisville, Kentucky, USA (Prof. Alan Morgan) 3. Autonomous University of Madrid, Sciences, Madrid, Spain (Prof. Tomás Torres) • Type of activity or field of work Research • Position held Researcher II degree; Post-doctoral fellow; scholarship holder • Main activities and responsibilities Conducting research under supervision

• Dates (from-to) **1991 - 1998**

• Name and address of the employer Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences Ul. "Acad. Georgi Bonchev", bl. 9, 1113 Sofia, Bulgaria

• Type of activity or field of work Scientific research in the field of bioorganic and analytical chemistry • Position held by Chemist; Researcher III degree; PhD student; • Main activities and responsibilities Conducting research under supervision

EDUCATION & TRAINING

• Dates (from-to) **1995 - 1998,** • Name and type of the training or educational organization Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences Ul. "Acad. Georgi Bonchev", bl. 9, 1113 Sofia • Basic subjects/professional skills According to the law with a diploma from the Higher Attestation Commission

• Title of the acquired qualification ONS "Doctor", **1998**

Doctor of Science, **2021** • Dates (from-to) 1993 - 1998, • Name and type of the training or educational organization Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences Ul. "Acad. Georgi Bonchev", bl. 9, 1113 Sofia • Basic subjects/professional skills covered According to the law with the Higher Attestation Commission

• Name of the acquired qualification "Doctor"

EDUCATION & TRAINING

• Dates (from-to) **1995 - 1998,** • Name and type of the training or educational organization Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences Ul. "Acad. Georgi Bonchev", bl. 9, 1113 Sofia • Basic subjects/professional skills According to the law with a diploma from the Higher Attestation Commission

• Title of the acquired qualification ONS "Doctor", **1998** Doctor of Science, **2021** • Dates (from-to) 1993 - 1998, • Name and type of the training or educational organization Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences Ul. "Acad. Georgi Bonchev", bl. 9, 1113 Sofia • Basic subjects/professional skills covered According to the law with the Higher Attestation Commission

• Name of the acquired qualification "Doctor"

PERSONAL SKILLS AND COMPETENCIES

Acquired in life or in the profession, but not certified by an official document or diploma.

• Dates (from-to) 1993 - 1998, • Name and type of the training or educational organization Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences Ul. "Acad. Georgi Bonchev", bl. 9, 1113 Sofia • Basic subjects/professional skills covered According to the law with the Higher Attestation Commission

• Name of the acquired qualification "Doctor"

1985 – 1990

VHTI – Sofia, now: University of Chemical Technology and Metallurgy (UCTM) Basic Natural Sciences and Subjects in Chemical Technology Specialties

Name of the acquired qualification: Chemical engineer.

I believe that the level of each candidate for the academic position of "professor" is determined by the scientometric indicators that are accepted today throughout the civilized world. They are objective and provide information about the overall scientific level. Ass. Dr. Vanya Mantareva has systematized in an Excel table the mandatory criteria for the academic position of "Professor" as follows:

Dissertation for awarding the educational and scientific degree "Doctor" - 50 points

Dissertation for awarding the scientific degree "Doctor of Sciences" - 100 points

Habilitation work – monograph included in world-famous databases with scientific information (SCOPUS and/or Web of Science) -0

Publications in Q1a1) **Mantareva, V***; Kussovski, V.; Orozova, P.; Dimitrova, L.; Kulu, I.; Angelov, I.; Durmus, M.; Najdenski, H. *Biomedicines*, **2022**, 10, 384. 3.25=752) **Mantareva, V.***; Iliev, I.; Sulikovska, I.; Durmus, M.; Genova, Ts., *Gels*, **2023**, 9, 475. 3) **Mantareva, V.***; Iliev, I.; Sulikovska, I.; Durmus, M.; Angelov, I. *Int. J. Mol. Sci*. **2023**, 24, 4400.

Publications in Q2a1) **Mantareva**, **V.*;** Braikova, D.; Vilhelmova-Ilieva, N.; Angelov, I.; Iliev, I. *Inorganics* **2024**, 12, 204.2) **Mantareva**, **V*;** Kussovski, V.; Orozova, P.; Angelov, I.; Durmus, M.; Najdenski, H. *Curr*. *Issues Mol*. *Biol*. **2022**, 44, 1950–1959. 2.20=40

Publications in Q3a -0

Publications in Q4a1) Gueorgieva, Tz.; Dimitrov, S.; Angelov, I.; **Mantareva,V**.; Dogandzhiyska, V. **2021**, *SYLWAN*, 165(9), 126-136.2) Dogandzhiyska, V.; Dimitrov, Sl.; Angelov, I.; **Mantareva, V**.; Gueorgieva, T. **2021**, *SYLWAN*, 165(9), 151-163.3) Mamilov, S.; Yesman, S.; **Mantareva, V**.; Borisova, E.; Gisbrecht, A. *Bulg. Chem. Communicat.*, **2020**, 52(1), 142-146. - 3.12=36т.

Publications in SJR without IFa1) Zaharieva, L.; Angelov, I.; Genova, Ts.; Kyurkchiev, D.; Tumangelova-Yuzeir, K.; Ivanova-Todorova, E.; **Mantareva, V.**; Karazapryanov, P.; Minkin, K.; Avramov, L.; Borisova, E. **2023**, *J. of Physics: Conference Series* 2487, 012024 2) Bucharskaya, A.; Maslyakova, G.; Navolokin, N.; Terentyuk, G.**; Mantareva, V.**; Genin, V.; Genina, E.; Tuchin, **2022**, *Proceed. SPIE* 12192, Optical Technologies for Biology and Medicine, 121920Z.3) Agranovich, I.; Khorovodov, Al.; Kanevsky, M.; Genova, Ts.; Gisbrecht, Al.; Angelov, I.; **Mantareva, V**.; Navolokin, N.; Semyachkina-Glushkovskaya, O.; Borisova, E. **2021,** *J. of Physics: Conference Series* 1859, 012038.4) Bucharskaya, A.; Maslyakova, G.; Chekhonatskaya, M.; Pakhomy, S.; Mudrak, D.; Navolokin, N.; Terentyuk, G.; Borisova, E.; **Mantareva, V**.; Angelov, I.; Khlebtsov, B.; Khlebtsov, N.; Genin, V.; Bashkatov, A.; Genina, E.; Tuchin, V. **2021**, *Proceed. SPIE* 11845, Optical and Nanotechnologies for Biology and Medicine, 1184508.5) Agranovich, I.; Khorovodov, A.; Kanevsky, M.; Genova-Hristova, Ts.; Gisbrecht, A.; Angelov, I.; **Mantareva**,Navolokin, N.; Semyachkina-Glushkovskaya, O.; Borisova, E. **2019**, *Proceed. SPIE* 11047, 20th International

Conference and School on Quantum Electronics: Laser Physics and Applications, 1104709.6) Borisova, E.; Genova, Ts.; Khorovodov, A.; Agranovich, I.; Kanevskiy, M.; Konnova, S.; Angelov, I.; **Mantareva, V**.; Navolokin, N.; Semyachkina-Glushkovskaya, O. **2019**, *Proceed. SPIE* 11079, Medical LaserApplications and Laser-Tissue Interact. IX, 110790N, Eur. Conf. on Biomedical Optics, Munich, Germany 7) Borisova, E.; Semyachkina-Glushkovskaya, O.; Navolokin, N.; **Mantareva, V.;** Angelov, I.; Agranovich, I.; Khorovodov, A.; Shushunova, N.; Bodrova, A.; Fedosov, I.; Namykin, A.; Abdurashitov, A.; Avramov, L. **2018,** *Proceed. SPIE* 10501, Optical Diagnostics and Sensing XVIII: Toward Point-of-Care Diagnostics, 105011E. 8) **Mantareva**, **V**.*; Iliev, I.; Sulikovska, I. **2023**, *J.* of *Physics*: *Conference Series*, 2487, 012023.9) Braikova, D; Angelov, I.; **Mantareva**, **V**.* **2025**, *J.* of *Physics*: *Conference Series* 2994, 012013 10.9 = 90 t.

Published chapter of a book or collective monograph , 20

Recognized utility model, patent or copyright certificate application, 0

Published patent application or utility model -0

Citations in scientific journals, monographs and collective volumes, refereed and indexed in world-renowned databases with scientific information (Web of Science and Scopus) period: 2022 -2025 249.2 = 498 tons.

Acquired scientific degree "Doctor of Sciences" - 75

Participation in a national scientific or educational project NSF: 2014-2017 (Avramov); 2019-2025 (Angelov) 2019-2023 (Assoc. Prof. E. Borisova, IE; Assoc. Prof. Kr. Minkin, Iv. Rilski, IOCCF - Partner);

-4.10=40t.

Participation in a national scientific or educational project NSF: 2014-2017 (Avramov); 2019-2025 (Angelov) 2019-2023 (Assoc. Prof. E. Borisova, IE; Assoc. Prof. Kr. Minkin, Iv. Rilski, IOCCF - Partner);

-20 t.

Participation in an international scientific or educational project, Russia (2020-2022); Poland (2024-2025) -2.20-40 pts.

Management of a national scientific or educational project, NSF (KP-06-H29/11, 2018-2022) 2.50-100 pts.

Leadership of the Bulgarian team in an international scientific or educational project (Turkey, 2013-2016; China, 2024-2026) 2.25=50 points.

Attracted funds for projects managed by the applicant (the total amount is filled in per number) BGN 120,000. (KP-06-H29/11, 2018 - 2022) and BGN 50,000 (KP-06-China/02, 2024-2026) = BGN 170,000, which is equal to 34 points (BGN 5,000-1 point)

Supervision of a successfully defended PhD student (n is the number of co-supervisors of the respective PhD student) -50 points.

1. Name of the PhD student and year of defense Meliha Bahri Aliosman, defense: 19.07.2019

Published textbook or textbook used in the school network (n is the number of co-authors)-0

Published textbook or textbook used in the school network (n is the number of co-authors)-0

Published university textbook used in the school network (n co-authors)-0

All the cited data for recent years show the growth of the candidate for the academic position of "Professor", especially the number of citations: 250 citations of publications included in the list for the competition are a serious achievement, which shows that she fully deserves it.

of Assoc. Prof. Vanya Nikolova Mantareva, PhD in the scientific papers for the competition for "Professor" in the professional field 4.2. Chemical Sciences, scientific specialty 01.05.10.

Bioorganic Chemistry, Chemistry of Natural and Physiologically Active Substances, SG No. 40/ 16.05.2025

Scientific publications and a book are attached for participation in the competition, which for the most part were published after the defense of the dissertation for the scientific degree of "Doctor of Sciences" (2021). The total number of scientific papers for the competition is **27 scientific papers** (indicators B and D), of which **24** are **the publications** in Scopus. First and only author for correspondence - **11** scientific works.

Articles from scientific forum reports (**9**) have been published in a journal (*JOP)* and in a series (*SPIE Proced.)*, which are indexed in Scopus. The list also contains **2** publications in journals with an impact factor from other databases. **The citations** for the competition (**249**) are for the period from 2022 to July 2025., selected so that there is no repetition of citations from other competitions, which in total for all scientific papers are > **950** citations, with H-index: **17** (Scopus) and **18** (including other databases). The Hirsch factor is 17, which shows that the research of Assoc. Dr. Mantareva are prominent and recognizable to the world scientific community and place her among the good Bulgarian scientists.

I will briefly mention the main directions in the scientific work of Assoc. Prof. Vanya Mantareva. The scientific topics of the publications and the author's book for the competition can be summarized as a purposeful development and study of the properties of photosensitive compounds, as photosensitizers for the method *of photodynamic therapy* (PDT), as well as for other applications based on photophysicochemical processes. The natural phenomenon of "photodynamic action" has been observed and applied empirically since antiquity, and in our modern times it is still relevant for new areas of application, due to the circumstances and necessity arising from modern challenges. PDT consists in the conduct, under optimally selected conditions, of cascade photophysical and subsequent photochemical processes, as a result of appropriate irradiation of a photosensitive compound. With a biological target, a rapid, local and sparing the body as a whole, therapeutic effect is observed. The method has the characteristics of an unconventional and palliative approach with main applications for biomedicine and ecology.

A careful examination of the newly synthesized photosensitizers by the candidate shows that she considers the processes of their design in a complex way: activity, value, possible toxicity. Of course, the most important problem remains the possibility of their synthesis. A new direction in the synthesis of new photosensitizers, continues the development of derivative structures based on the porphyrin ring, summarized as porphyrinoid compounds, as well as other new ones photoactive compounds with a different structure from porphyrin. All of them are defined as second and third generation photosensitizers.

The latest results show different success rates of the scientific community's efforts to minimize the main shortcomings related to the hydrophobic nature and solubility, the "transport", accumulation and clearance of cells and organs, with selectivity and dark toxicity, as the main problems in clinically approved photosensitizers.

Ass. Prof. Dr. Mantareva has grouped her results and contributions, putting the directions in the first place. I accept this way of presentation and use it in my review.

II. Directions, results and contributions *1. New phthalocyanine complexes as photosensitizers for PDT: synthesis and photo-properties. (B 1-6; G5, G7, G15).* New structures of photosensitizers for PDT have been *obtained* on the basis of
phthalocyanin ring and biologically active fragments as substituent groups.

Phthalocyanin complexes with cationic groups in a non-peripheral position have been obtained by analogy with peripheral derivatives from their previous work.

2. Natural photosensitizers for photodynamic method: (1) cobalamin derivatives - properties and contributions; (2) anthraquinones for PDT? 2.1. Cobalamins: photo-physicochemical and biological properties. (3B, 12D)

Cobalamin is commonly known as vitamin B12 and is characterized by a complex molecular structure based on a corrin ring and molecular fragments of deoxyadenosyl or methyl group in the axial position of cobalt, which is characteristic of natural derivatives, as well as dimethylbenzimidazole.

The properties of cobalamin were investigated under conditions that apply to the characterization of a photosensitive compound.

Evaluation of photosafety compounds under non-specific standard conditions, such as light source spectrum and radiation doses (360-960 nm, Helios-iO; 10 J/cm2), showed a wide concentration range of nontoxicity (< 1000 μM) for cobalamins in treated embryonic cells (BALB 3T3). The results obtained showed photosafety of both forms of cobalamin (cyano- and hydroxy-cobalamin) in a wide concentration range. Studies of PDT - the effect of cobalamin alone and under conditions of PDT with phthalocyanine complexes were carried out *in vitro* with tumor cell lines (MCF-7 and MDA-MB-231) and for comparison on healthy model cells

2.2. Anthraquinones of plant origin: available results and prospects for the development of new photosensitisers. (4D)

The green approach in all areas of our modernity is emerging as a potential way and in the development of the photodynamic method with a focus on its components - photosensitive compound and radiation spectrum - the so-called "photodynamic approach" is being developed. "green PDT" method. Currently, there are no clinically approved plant-isolated photosensitisers, with the exception of hypericin (*Hypericum perforatum*, St . John's wort), which, after many years of research, is at the stage of pre- and clinical studies.

3. Conjugates of phthalocyanine complexes with proteins and enzymes: photo- properties and PDT effects. (2B, 4B, 14D)

Physical conjugates based on phthalocyanins with *biologically* active protein (*collagen hydrolysate) and* enzyme (α-hemotrypsin*)* have been obtained and characterized, as native biomolecules with physiological functionality, and with transmission system capabilities.

4. Development of the photodynamic method with phthalocyanins for socially significant diseases (1-2B, 4-5B, 7B, 2D, 4G, 6-9D) *4.1. Antimicrobial photodynamic therapy*

Photodynamic therapy is an established method for effectively inactivating pathogenic bacteria, especially in the current reality of increasing multidrug resistance. Studies have been conducted with Pd(II) vs. Zn(II) phthalocyanin complexes in the *Aeromonas hydrophila strain,* as clinical isolates - sensitive and resistant to antibiotics. The results showed a complete inactivation effect with Pd(II) - a complex at concentrations > 5μM, regardless of the sensitivity of the strain.

4.2. Photodynamic inactivation of viruses

The application of the photodynamic method for virus inactivation has become very relevant with the health crisis caused by the last pandemic. The contribution of Assoc. Prof. Mantareva on the topic is to monitor the effectiveness of PDT under different conditions of virus-host cell interaction . confirmed that PDT is a reliable and unambiguous method of inactivating envelope viruses for all stages of infection of host cells under experimental conditions.

III. Research work for the coming years

1. Sustainable*, green approaches to synthesis: development and development of a "green method" for the production of phthalocyanins*

In recent years, the synthesis of phthalocyanins using "green methods" has been well documented in the scientific literature.

2. Studies of exosomes (LncRNA) and matrix metalloproteases (MMP) as a natural target in tumor therapy (project with China)
In clinical practice, MMPs are also used as an accurate indicator of early detection in some types of tumors, as well as as a suitable target for the development of inhibitors for tumor therapy
4. Development of the photodynamic method with phthalocyanins for socially significant diseases (1-2B, 4-5B, 7B, 2D, 4G, 6-9D) 4.1. Antimicrobial photodynamic therapy
Photodynamic therapy is an established method for effectively inactivating pathogenic bacteria, especially in the current reality of increasing multidrug resistance. Studies have been conducted with Pd(II) vs. Zn(II) phthalocyanin complexes in the *Aeromonas hydrophila strain,* as clinical isolates - sensitive and resistant to antibiotics. The results showed a complete inactivation effect with Pd(II) - a complex at concentrations > 5μM, regardless of the sensitivity of the strain.

4.2. Photodynamic inactivation of viruses
The application of the photodynamic method for virus inactivation has become very relevant with the health crisis caused by the last pandemic. The research conducted at IMiB-BAS has confirmed that PDT is a reliable and unambiguous method for inactivating enveloped viruses for all stages of cell infection-host in experimental conditions.
In conclusion**,** all scientific research conducted in recent years by Assoc. Prof. Dr. Vanya Mantavava and associates, as part of the research activity, are focused on the third generation photosensitizers for the PDT method. Phthalocyanine complexes of various metals have been obtained, and the ones that have shown the best effect for the PDT method are the complexes of lutetium, palladium and gallium, studied in comparative aspect with the same compounds as ligands and as zinc complexes. global trend. I define *these studies as obtaining and proving new facts, as well as proving by new means of already existing problems, theories and hypotheses*
I define scientific contributions here as the creation of new methods for analysis and synthesis of new materials of the second and third generations for photodynamic applications.

When reviewing the present materials, I did not find any significant errors in terms of: staging; analyses and generalizations; methodological level; accuracy and completeness of results; literary awareness. I found only minor inaccuracies in the spelling of some forms in the materials written in Bulgarian, for example, in some cases it is written okis (a correct Bulgarian word), in other places oxide (rough foreign). All these remarks do not change my high opinion of the qualities of the presented materials for acquiring the academic position of "Professor".

Conclusion

After I have familiarized myself with the presented materials, and on the basis of the analysis of their significance and the scientific and applied contributions contained in them, I confirm that the scientific achievements meet the requirements of the Law on the Implementation of the Law on the Implementation of the Law and the relevant Regulations of the Institute of Physics and Physics for the acquisition of the academic position of "Professor". In particular, the candidate satisfies the minimum national requirements in the professional field and no plagiarism has been found in the materials and scientific papers submitted under the competition.

I give my **positive** assessment of the materials on the competition.

II. GENERAL CONCLUSION

Based on the above, I confidently state that Assoc.Prof. DSc Vanya Nikolova Mantareva
The significant scientific achievements of the candidate, the relevance and perspective of the research results give me grounds to confidently recommend to the Scientific Jury to fully accept the materials submitted in the competition, to evaluate them positively, to select and propose

Ass. Prof. DSc Vanya Nikolova Mantareva

for occupying the **academic position of "Professor"** in the professional field 4.2. .4.2 Chemical Sciences, scientific specialty: Biorganic Chemistry, Chemistry of Natural and Physiologically Active Substances at IOHCP BAS

12.09.2025
Sofia

Prepared the review: .....
(Prof. Tsonko Kolev, PhD)