REVIEW

by DSc. Panteley Petrov Denev - Professor
University of Food Technologies - Plovdiv
of the materials submitted for participation in the competition
for the academic position of "Associate Professor"
at Plovdiv University "Paisii Hilendarski"
in: field of higher education 4. Natural Sciences, Mathematics and Informatics;
professional field 4.2. Chemical Sciences (Organic Chemistry, Bioorganic Chemistry)

In the competition for "Associate Professor", announced in the State Gazette, No. 98 of 19.11.2024 and on the website of Plovdiv University "Paisii Hilendarski" for the needs of the Department of "Organic Chemistry" at the Faculty of Chemistry, as a candidate, Senior Assistant Professor Dr. Mina Mihaylova Todorova from Plovdiv University "Paisii Hilendarski" participated

General presentation of the received materials

Hilendarski" (PU) I have been appointed as a member of the scientific jury of a competition for the academic position of "Associate Professor" at PU in the field of higher education 4. Natural Sciences, Mathematics and Informatics; professional field 4.2. Chemical Sciences (Organic Chemistry, Bioorganic Chemistry), announced for the needs of the Department of "Organic Chemistry" at the Faculty of Chemistry,

A single candidate has submitted documents for participation in the announced competition: Senior Assistant Professor Dr. Mina Mihaylova Todorova from Plovdiv University "Paisiy Hilendarski".

The set of materials submitted by Mina Todorova on an electronic medium is in accordance with the Regulations for the Development of the Academic Staff of PU, and includes the following documents:

– application for admission to participate in the competition
– CVs
– diploma for the "Master" qualification
– diploma for the "Doctor" qualification
– list of scientific works
– list of citations
– copies of scientific publications
– reference for the minimum faculty qualifications requirements
– annotation of materials and self-assessment of contributions
– declaration of originality of attached documents
– work experience document
– academic work document
– research work document
– other documents

The candidate has declared the fulfillment of the minimum requirements for holding the academic position of "associate professor", specified in Table 1.

Table 1. Fulfillment of national minimum requirements

No.	Group of indicators	Minimum required number of points	Declared number of points
1.	A	50	50
2.	B	-	
3.	C	100	170
4.	D	200	285
5.	E	50	304
	Total	**400**	**809**

Based on the documents provided to me and the reference made in NACID, Web of Science and Scopus, I declare the accuracy of the data presented below for the minimum required points by groups of indicators for holding the academic position of associate professor in professional field 4.2. Chemical Sciences.

Group of indicators A

The scientific degree "Doctor" obtained by Mina Todorova on the topic "Synthesis, spectral and structural study of new merocyanine dyes with potential applications in optical technologies" is registered in NACID with diploma 1000142 / 06.04.2015. Two publications have been entered in NACID for the minimum required number of points of 30, with total indicators of 45 points:

El Ouazzani H., Dabos-Seignon S., Gindre D., Iliopoulos K., **Todorova M**., Bakalska R., Penchev P., Sotirov S., Kolev T., Serbezov V., Arbaoui A., Bakasse M., Sahraoui B. *Novel styrylquinolinium dye thin films deposited by pulsed laser deposition for nonlinear optical applications.* Journal of Physical Chemistry C 2012, 116 (12), 7144 - 7152.I. **Q1**

Todorova M., Bakalska R., Kolev T. *Synthesis, crystal structure, and spectroscopic properties of new stilbazolium salt with enlarged π-conjugated system*. Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy **2013**, *108*, 211 - 222. **Q2**

Group of indicators C

B.4.1. Todorova M., Seidel R.W., Stoyanova M., Kolev T.M., Bakalska R. *Comparing the crystal structures and spectroscopic properties of a p-hydroxy styrylquinolinium dye with those of its p-dimethylamino analogue*. Heliyon **2024**, *10 (8)*, e29315. **Q1.**

B.4.2. Sotirov S., **Todorova M.**, Draganov M., Penchev P., Bakalska R., Serbezov V. *Investigation of new stilbazolium dye thin films deposited by pulsed laser deposition*. Proceedings of SPIE - The International Society for Optical Engineering **2013**, *8770*, 87700E.

B.4.3. Todorova M., Bakalska R. *Syntheses and vibrational spectroscopic characteristics of series ionic merocyanine dyes*. Bulgarian Chemical Communications 2018, *50*, 156 - 164. **Q4**

B.4.4. Hubenova Y., **Todorova M.**, Bakalska R., Mitov M. *Photophysical and Electrochemical Properties of Newly Synthesized Stilbazolium Dyes*. ChemElectroChem **2022**, *9 (24)*, e202200918.**Q1**

B.4.5. Todorova, M., Bakalska, R., Feizi-Dehnayebi, M., Ziarani, G.M., Pencheva, M., Stojnova, K., Milusheva, M., Nedialkov, P., Cherneva, E., Kolev, T., Nikolova, S. *Synthesis, Anti-Inflammatory Activity, and Docking Simulation of a Novel Styryl Quinolinium Derivative*. Applied Sciences **2025**, 15, 284.**Q2**

B.4.6. Bakalska, R., **Todorova,** M., Sbirkova, H., Shivachev, B., Kolev T. *Comparing of the crystal structure and spectroscopic properties of some stilbazolium dyes with enlarged π-conjugated system I. Chromophores with p-dimethylamino group*. Dyes and Pigments **2017**, *136*, 919-929. **Q1**

B.4.7. Tumbarski Y., Todorova M., Topuzova M., Gineva G., Yanakieva V., Ivanov I., Petkova N. *Comparative Study on Physicochemical, Antioxidant and Antimicrobial Properties of Propolis Collected from Different Regions of Bulgaria*. Journal of Apicultural Science 2023, *67 (1)*, 37 – 56 **Q3**

B.4.8. Tumbarski Y., Topuzova M., Todorova M. *FOOD INDUSTRY APPLICATIONS OF PROPOLIS: A REVIEW*. Journal of Hygienic Engineering and Design **2022**, 40, 257 - 265. **Q4**

B.4.9. Tumbarski Y.D., **Todorova M.M.**, Topuzova M.G., Georgieva P.I., Petkova N.T., Ivanov I.G. *Postharvest Biopreservation of Fresh Blueberries by Propolis-Containing Edible Coatings Unde* **Q3**

B.4.10. Tumbarski Y.D., Todorova M.M., Topuzova M.G., Georgieva P.I., Ganeva Z.A., Mihov R.B., Yanakieva V.B. *Antifungal activity of carboxymethyl cellulose edible films enriched with propolis extracts and their role in improvement of the storage life of kashkaval cheese*. Current Research in Nutrition and Food Science **2021**, *9 (2)*, 487 - 499. **Q3.**

Total points 174 out of a minimum of 100

Group of indicators D

Г.7.1. Gerasimova A., Nikolova K., Petkova N., Ivanov I., Dincheva I., Tumbarski Y., Yanakieva V., **Todorova M.**, Gentscheva G., Gavrilova A., Yotkovska I., Nikolova S., Slavov P., Harbaliev N. Metabolic Profile of Leaves and Pulp of *Passiflora caerulea* L. (Bulgaria) and Their Biological Activities. *Plants* **2024**, *13 (13)*, 1731. **Q1.**

Г.7.2. Ivanov I., **Todorova M**., Petkova N., Dincheva I. Non-polar phytochemical compounds from dandelion (Taraxacum officinale Weber ex F.H. Wigg.) flowers. *Bulgarian Chemical Communications* 2024, *56*, 96 - 99**. Q4**

Г.7.3. Petrova I., Petkova N., Ivanov I., **Todorova M.**, Ognyanov M., Bileva T., Haytova D. Bioactive compounds and antioxidant activity of extracts from edible flowers of punica granatum and citrus aurantium. *Journal of Hygienic Engineering and Design* **2021**, *33*, 120 - 129. **Q4**

Г.7.4. Tumbarski, Y., Ivanov, I., **Todorova,** M., Gerasimova, A., Dincheva, I., Makedonski, L., Nikolova, K. Chemical Composition and Biological Activities of St John's Wort (*Hypericum perforatum L.*) Essential Oil from Bulgaria. *Applied Sciences* **2024**, *14*, 11754. **Q2**

Г.7.5. Tumbarski Y., Petkova X., **Todorova M.**, Ivanov I., Deseva I., Mihaylova D., Ibrahim S.A. Effects of pectin-based edible coatings containing a bacteriocin of Bacillus methylotrophicus BM47 on the quality and storage life of fresh blackberries. *Italian J. of Food Science* **2020**, *32 (2)*, 420 - 427. **Q3**

Г.7.6. Vilhelmova-Ilieva N.M., Nikolova I.N., Nikolova N.Y., Petrova Z.D., Trepechova M.S., Holechek D.I., **Todorova M.M.**, Topuzova M.G., Ivanov I.G., Tumbarski Y.D. *Antiviral Potential of Specially Selected Bulgarian Propolis Extracts: In Vitro Activity against Structurally Different Viruses*. Life **2023**, *13 (7)*, art. no. 1611. **Q1**

Г.7.7. Petkova N.Tr., Arabadzhiva R.D., Tumbarski Y.D., Todorova M.M., Hambarlyiska I.P., Ivanov I.G., Ibryamova S.F., Ignatova-Ivanova T.V. Physicochemical properties and antimicrobial activity of acetylated chicory fructooligosaccharides. *Philippine Journal of Science* **2021**, *150 (3)*, 995 - 1004. **Q3**

Г.7.8. Arabadzhieva R., Ivanov I., Petkova N., **Todorova M.**, Tumbarski Y., Vlaeva I., Vilhelmova-Ilieva N., Nikolova I., Simeonova L. Microwave-assisted synthesis of lactose acetates with antimicrobial, cytotoxic, and antiviral properties. *Biointerface Research in Applied Chemistry* **2022**, *12 (6)*, 8453 - 8470. **Q3**

Г.7.9. Milusheva M., Gledacheva V., Stefanova I., Pencheva M., Mihaylova R., Tumbarski Y., Nedialkov P., Cherneva E., **Todorova M.**, Nikolova S. *In Silico, In Vitro, and Ex Vivo Biological Activity of Some Novel Mebeverine Precursors*. Biomedicines **2023**, *11 (2)*, art. no. 605. **Q1**

Г.7.10. 6. Nikolova S., Milusheva M., Gledacheva V., Feizi-Dehnayebi M., Kaynarova L., Georgieva D., Delchev V., Stefanova I., Tumbarski Y., Mihaylova R., Cherneva E., Stoencheva S., **Todorova M.** *Drug-Delivery Silver Nanoparticles: A New Perspective for Phenindione as an Anticoagulant*. Biomedicines **2023**, *11 (8)*, 2201. **Q1**

Г.7.11. Milusheva M., Gledacheva V., Stefanova I., Feizi-Dehnayebi M., Mihaylova R., Nedialkov P., Cherneva E., Tumbarski Y., Tsoneva S., **Todorova M.**, Nikolova S. *Synthesis, Molecular Docking, and Biological Evaluation of Novel Anthranilic Acid Hybrid and Its Diamides as Antispasmodics*. International Journal of Molecular Sciences **2023**, *24 (18)*, 13855. **Q1**

Г.7.12. Milusheva M., **Todorova M.**, Gledacheva V., Stefanova I., Feizi-Dehnayebi M., Pencheva M., Nedialkov P., Tumbarski Y., Yanakieva V., Tsoneva S., Nikolova S. Novel Anthranilic Acid Hybrids—An Alternative Weapon against Inflammatory Diseases. Pharmaceuticals **2023**, *16 (12)*, 1660. **Q1**

Г.7.13. Todorova M., Milusheva M., Kaynarova L., Georgieva D., Delchev V., Simeonova S., Pilicheva B., Nikolova S. *Drug-Loaded Silver Nanoparticles—A Tool for Delivery of a Mebeverine Precursor in Inflammatory Bowel Diseases Treatment*. Biomedicines **2023**, *11 (6)*, 1593. **Q1**

Г.7.14. Stoyanova M., Milusheva M., Gledacheva V., Stefanova I., **Todorova M.**, Kircheva N., Angelova S., Pencheva M., Stojnova K., Tsoneva S., Nikolova S. *Spasmolytic Activity and Anti-Inflammatory Effect of Novel Mebeverine Derivatives* Biomedicines **2024**, *12 (10)*, 2321. **Q1**

Total points 285 out of a minimum of 200

Group of indicators E

The list submitted by the candidate shows citations in articles indexed in Web of Science and Scopus – 152 items. Copies of the author's user profile in these databases are presented as an appendix. A detailed list of links to the articles in which citations were found is presented.

Total number of points 304 points out of a minimum of 50.

The additional minimum requirements of the Faculty of Chemistry of the University of Sofia include teaching and learning activities (Protocol No. 211/15.10.2019). Senior Assistant Professor M. Todorova has completed 6,712 hours, with a required minimum of 1,080 hours.

Brief biographical data

During the period 1998-2003, Mina Mihaylova Todorova. studied all chemical disciplines, physics, mathematics, etc. in the specialty "Chemistry" at the Faculty of Chemistry of the University "Paisiy Hilendarski", successfully defended her thesis and graduated with a Bachelor's degree. She continued her education at the same university, studying Chemistry of Medicinal Substances, Analysis of Medicinal Substances, Chemistry of Heterocyclic Compounds, Biochemistry, Clinical Chemistry, etc. in the specialty "Medicinal Chemistry". She obtained a Master's degree in 2005. Since 2007, after successfully winning a competition, she has been appointed as an assistant at the University of Food Technology - Plovdiv, Faculty of Technology, Department of Organic Chemistry. From 2010-2015, she has been a part-time doctoral student at the University of Food Technology - Plovdiv, Faculty of Chemistry, Department of Organic Chemistry. Under the scientific supervision of Prof. Tsonko Kolev and Assoc. Prof. Rumyana Bakalska works in the field of organic synthesis, structural and spectral analysis. In 2015, she defended her dissertation on the topic "Synthesis, spectral and structural study of new merocyanine dyes with potential applications in optical technologies", acquired the ONS "doctor" and was appointed to the academic position "chief assistant" at the University of Food Technologies. From 01.10.2021 to the present, after winning a competition, she is a chief assistant at the Plovdiv University "Paisiy Hilendarski", Faculty of Chemistry, Department of "Organic Chemistry".

General characteristics of the candidate's research and applied scientific activities

24 scientific publications (10 of the publications are by indicator B.4. and 14 – by indicator D.7.) and 2 teaching aids are submitted for participation in the competition, which do not repeat the materials used in the previous procedures for acquiring the ONS "doctor" and for occupying the academic position "chief assistant". The 24 scientific articles submitted are published in publications, referenced and indexed in Scopus and/or Web of science databases, as follows: Q1 - 10, Q2 - 2,.Q3 - 7, Q4 – 4, referenced but not indexed – 1.

In the scientific research of senior asst. dr. M. Todorova, presented in scientific publications, can be grouped into the two academic disciplines, according to which it is determined:

• "Organic Chemistry" - design, synthesis, spectral properties and structural characterization of new styrylquinolinium compounds with potential nonlinear optical activity;

• "Biochemistry" - study of the biological activity of propolis and presentation of its pharmacological potential.

Of the scientific publications presented, 6 are studies on the design, synthesis, spectral properties and structural characterization of styrylquinolinium compounds with potential nonlinear optical (NLO) activity.

Organic UFO materials are of exceptional scientific and technological interest not only because of their applications in signal processing devices, ultra-high-speed optical communication, data storage, optical limiters, logic circuit devices, optical switches, optical computers, ultrashort pulse lasers, sensors, laser amplifiers, in terahertz technologies in security screening, detection and analysis of substances, medical imaging, atmospheric monitoring, terahertz communication, astronomical research,

terahertz radar, etc., but also because of the fundamental research related to issues such as charge transfer, conjugation, polarization and crystallization in centrosymmetric and non-centrosymmetric lattices and the interaction of matter with light.

The synthesis of six dyes with UFO activity is applied in the report. In the design of UFO-phores, synthetic approaches for their preparation were optimized, using such structural elements (donor and acceptor) to increase molecular asymmetry, which in turn leads to an increase in the second-order nonlinear optical response. The newly synthesized compounds were characterized spectrally (IR, UV-Vis, fluorescence spectroscopy) and structurally (X-ray diffraction), *in vitro* anti-inflammatory activity

Based on the UV-visible spectra, the energies of the ground and excited states were calculated, as well as the difference in energies between the levels of three dyes with 15 identical acceptor parts and different donor parts hydroxyl at 4- and 2- positions and N,N-dimethylamino group at 4-position in the naphthalene nucleus. It was found that the lower the difference in the energy of the ground and excited states, the easier the charge transfer occurs.

Single crystal X-ray diffraction was performed on three of the compounds. Thin films of one of the studied dyes were successfully deposited using the PLD technique. The chemical composition and surface of the deposited layers were studied.

The reversible electrochemical reaction (oxidation/reduction) of three dyes was evaluated. The influence of the nature of the donor moieties was also established. A quantitative approach was adapted to assess the inhibition of albumin denaturation, an indicator for determining in vitro anti-inflammatory activity. *Ex vivo* evaluation, *in silico* calculations and molecular docking were also used to validate the method.

Of the scientific publications presented, 4 are studies on the biological activity of propolis and presentation of its pharmacological potential.

The rich chemical composition of propolis determines its high biological activity and therapeutic properties. Its antimicrobial, antioxidant, anti-inflammatory, antiparasitic, anticarcinogenic, hepatoprotective, antiulcerogenic, antiallergic, antidiabetic, immunomodulatory, anesthetic and other effects are widely used in medicine in the treatment of various diseases

A large-scale, planned study of eighty propolis samples obtained from the 28 regions of Bulgaria, including the five climatic zones, was conducted. Despite intensive chemical and pharmacological studies of propolis and numerous scientific publications in recent years, information on Bulgarian propolis is still limited. The study enriches the information on the physicochemical parameters, antioxidant and antimicrobial activity of propolis collected from different regions of Bulgaria. A relationship has been established between the region from which propolis was isolated with its physicochemical properties, content of polyphenols and flavonoids and, accordingly, the relationship to the antioxidant and antimicrobial activity of propolis. The highest antioxidant values of propolis coincide with the highest concentrations of phenols and flavonoids. High antimicrobial activity of propolis extracts against Gram-positive bacteria has been proven, which allows the creation of edible coatings from carboxymethylcellulose with propolis included over the shelf life of food products. It has been proven that edible coatings effectively protect the studied products.

The results obtained have practical application and can be accepted as a contribution of a confirmatory and applied nature.

Part of the scientific results have been reported at 8 conferences in Bulgaria and 7 at international conferences. The scientific achievements have been published in 24 co-authored publications, all with a total IF (WoS) = 54.232 and an impact rank (SJR) = 13.538.

The candidate's identification data for the scientific indicators in the world databases are:

Mina Todorova - Scopus Author ID: 21741536800, h-index 9
Web of Science Researcher ID: HNS-4987-2023, h-indexc 8
ORCID ID https://orcid.org/0000-0002-0850-0902
Bibliographic descriptions in Google Science h-index 12
i10-index 15.

The candidate - Senior Assistant Professor Dr. Mina Mihaylova Todorova meets the minimum scientometric indicators described in the PPZRASRB and all indicators of the Regulations of the Plovdiv University "Paisiy Hilendarski", determining the requirements for holding the academic position of associate professor. I declare that I have not found any evidence of plagiarism or incorrect interpretation of the results in the submitted scientific publications.

Evaluation of the candidate's teaching activity

Senior Assistant Professor Dr. Mina M. Todorova has provided assurance that she works at the University under a basic employment contract with order P34-1557/01.10.2021 in the Department of Organic Chemistry at the Faculty of Chemistry and continues to work. As of 26.11.2024, she has a total work experience of 19 years, 02 months, 20 days, of which 17 years, 08 months, 25 days is teaching. Mina Todorova has an experience as a "chief assistant" of 13 years, 01 months, 23 days and acquired the educational and scientific degree "doctor" 9 years, 07 months and 26 days ago.

Her work as a lecturer began in 2007 at the Department of Organic Chemistry of the University of Food Technology, Plovdiv. During the academic years 2008/2021, she conducted a total of 4846 hours of teaching hours with bachelor's and master's students from the Faculty of Technology and Economics of the university. The classroom work includes laboratory exercises in the disciplines Organic Chemistry, Chemistry of Natural Compounds, Biologically Active Substances, General Food Chemistry, Biochemistry, Chemistry of Food and Processes and Chemistry of Food Aroma. Lectures were held in Chemistry (for foreign students, preparatory group), as well as in Chemistry of Food Aroma.

A curriculum for the discipline Chemistry of Food Aroma has been developed for bachelor's students in the specialties Chemistry and Microbiology of Food and Analysis and Control of Food Products.

In the period 2016-2021 as a part-time lecturer at the Department of Organic Chemistry of the University of Plovdiv, I have conducted 633 hours of laboratory exercises in the discipline of Organic Chemistry with students of the Faculty of Chemistry.

During the academic years 2021/2024 as a member of the Department of Organic Chemistry of the University of Plovdiv, she conducted 1233 hours, including lectures, laboratory and seminar exercises in the discipline of Organic Chemistry, laboratory exercises in the discipline of Bioorganic Chemistry, lectures and laboratory exercises in the discipline of Dye Chemistry with bachelor students from the specialties of Chemistry, Medical Chemistry, Chemical Analysis and Quality Control and Chemistry with Marketing. A curriculum for the discipline of Dye Chemistry has been developed.

She has published two textbooks in co-authorship with lecturers from the Department of Organic Chemistry of the University of Plovdiv, intended for bachelor students from the Faculty of Technology and Economics, students from other higher education institutions in the country and specialists from various scientific fields.

1. Food Chemistry - a guide for laboratory exercises, 2022, P. Denev N. Petkova, M Todorova, Reviewers: Assoc. Prof. Dr. N. Kirchev Assoc. Prof. Dr. M. Kuncheva, Technical Editor: T. Derekuvliev, ISBN 978-954- 24-0291-6, "Macros"

2. Manual for exercises on the basics of culinary chemistry, 2015, P. Denev, Ant. Slavov, Iv. Ivanov, Iv. Vasileva, M. Todorova, N. Petkova, At. Pavlov, Reviewer: Assoc. Prof. Dr. M. Kircheva, Scientific Editor: Assoc. Prof. Dr. N. Kirchev, ISBN 978-954- 24-0262-6, Academic Publishing House UHT - Plovdiv,

For the period 2022-2024, she was the scientific supervisor of 6 successfully defended diplomas. Three of them have participated in a total of 4 student scientific conferences.

The candidate - Senior Assistant Professor Dr. Mina Mihaylova Todorova meets all the requirements for teaching activities described in the Regulations of the Plovdiv University "Paisiy Hilendarski", determining the requirements for holding the academic position of associate professor.

CONCLUSION

The documents and materials presented by Ch. Assoc. Prof. Dr. Mina Mihaylova Todorova meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADSRB), the Regulations for the Implementation of the ADSRB, the Regulations of the Plovdiv University "Paisiy Hilendarski", describing the manner of occupying academic positions.

The candidate in the competition has presented a sufficient number of scientific works published after the materials used in the defense of the ONS "Doctor" and for acquiring the academic position "Senior Assistant". The candidate's works contain original scientific and applied contributions that have received international recognition, as a representative part of them have been published in journals and

scientific collections published by international academic publishing houses. His theoretical developments have practical applicability. The scientific qualification of Assoc. Prof. Dr. Mina Mihaylova Todorova is undoubted. The results achieved by Assoc. Prof. Dr. Mina Mihaylova Todorova in scientific and research activities, fully correspond to the specific requirements of the announced competition.

After my acquaintance with the submitted documents and scientific works, their significance, the scientific and scientific-applied results contained in them, I give a positive assessment and recommend that a report-proposal be prepared by the scientific jury to the Faculty Council of the Faculty of Chemistry with a proposal for Senior Assistant Professor Dr. Mina Mihaylova Todorova to occupy the academic position of "Associate Professor" in the scientific field 4. Natural Sciences, Mathematics and Informatics, professional field 4.2. Chemical Sciences in the disciplines "Organic Chemistry" and "Bioorganic Chemistry" for the needs of the Department of "Organic Chemistry" at the Faculty of Chemistry of the Plovdiv University "Paisiy Hilendarski", announced in the State Gazette No. 98 of 19.11.2024.

07.02.2025 Reviewer: .....