

REVIEW

By Assoc. Prof. Bissera Pilicheva, PhD

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Member of the Scientific jury, appointed by Order № RD-38-454/21.09.2021 by the Rector
of Sofia University “St. Kliment Ohridski“**

REGARDING: Competition for the academic position “Associate Professor” in Pharmaceutical technology, professional area 7.3. Pharmacy, announced in State Gazette, issue 63/30.07.2021 for the needs of the Department of engineer chemistry and pharmaceutical engineering.

I. Analysis of the career profile of the applicant

The competition for the academic position “Associate Professor” in Pharmaceutical technology, professional area 7.3. Pharmacy, was announced in State Gazette, issue 63/30.07.2021 for the needs of the Department of engineer chemistry and pharmaceutical engineering. Chief Assistant Professor Zachary Vinarov is the only applicant in the competition.

Zachary Vinarov obtained Master’s degree in Pharmacy at the Medical University of Sofia in 2009. In 2014 he defended his doctoral thesis themed “In vitro studies of triglyceride lipolysis in the gastrointestinal tract” in Sofia University “St. K. Ohridski” and was awarded a PhD degree in Chemical sciences. In 2021 he defended his second doctoral thesis in the field of Pharmaceutical sciences in doctoral programme “Pharmaceutical technology and biopharmacy” entitled “Enhancing solubility of hydrophobic drugs via solubilisation in micelles of surface active agents”.

The candidate began his professional development in 2008 at the Faculty of Chemistry and Pharmacy of Sofia University "St. Kliment Ohridski" at the Department of Engineering Chemistry and Pharmaceutical Engineering, where he held the positions of chemist, assistant professor and chief assistant professor. He is involved in teaching in “Pharmaceutical technology”, “Dispersions in pharmaceutical technology”, “Colloid sciences” and “Chemical kinetics”. In 2019 he joined the Department of pharmaceutical and pharmacological sciences of KU Leuven, Belgium, where he is appointed a postdoctoral fellow in the field of drug delivery. Zachary Vinarov is a member of foreign

scientific organizations (AAPS, EUFEPS) and editorial boards of reputable publishers (MDPI, Wiley). Fluent in English, Russian and French.

The analysis of the biographical data of Zachary Vinarov shows that the career profile of the candidate and his professional development fully correspond to the announced competition for associate professor of Pharmaceutical technology and biopharmacy.

II. General description of the submitted materials for the competition

To participate in the competition, the candidate has submitted a complete set of documents in accordance with the requirements of the Regulations on the terms and conditions for acquiring scientific degrees and holding academic positions at Sofia University "St. Kliment Ohridski ", namely: application for participation in the competition, CV, diplomas for completed higher education and acquired doctoral degrees, certificates for academic positions and work experience in the specialty, lists of scientific papers, participation in scientific forums and projects, reference for fulfillment of the minimum national requirements and the additional requirements of Sofia University "St. K. Ohridski ", references for the indicators under Art. 112, para. 2 (teaching and research activity), reference for the scientific contributions and for the citations, copies of the scientific publications and their summaries. All documents have the necessary details and are duly certified, precisely arranged and very well systematized, and in full compliance with the Act for the Development of the Academic Staff in the Republic of Bulgaria.

III. Evaluation of the scientific work of the applicant for the overall academic career

For participation in this competition Ch. Asst. Prof. Zachary Vinarov presented the following scientific papers:

- **dissertation thesis** for acquiring doctoral degree in professional area 7.3. Pharmacy with 2 publications to it (both publications are in scientific journals with impact factor (JCR);
- **monograph** entitled „Solubilisation: fundamental principles and biopharmaceutical applications“, ISBN 978-954-07-5307-2, University Publisher „St. Kliment Ohridski“, 2021. The monograph is in the process of printing, which the candidate certifies with an official note from the publisher;

- **book** based on a defended dissertation for the doctoral degree entitled "Mechanisms of solubilization of hydrophobic drugs from surfactants" with ISBN 978-954-07-5298-3, University Publishing House "St. Kliment Ohridski", 2021, under printing (attached official note from the publishing house);
- **scientific publications** in journals indexed in the SCOPUS and Web of Science databases: a total of 17 (publications № 1-9 and 12-17 of the Candidate's Scientific Publications List, Annex 10B), all in impact factor (JCR) journals. In 8 of them the candidate is the first author, which testifies to his leading participation and accumulated experience in conducting valuable research with significant scientific and practical results. Three of the publications presented in the List of Candidates (№ 18-20) are submitted to the dissertation for the acquisition of doctoral degree in professional field 4.2. Chemical sciences and should not be included in the List of scientific works, as they are not in the scope of this competition.

The subject of Zachary Vinarov's scientific works is in several directions. Much of the candidate's work is focused on the search for and optimization of approaches to increase the aqueous solubility of hydrophobic drugs by solubilization in colloidal aggregates. This is a serious challenge facing the pharmaceutical industry, given the possibility of their oral administration and improving their oral bioavailability. The candidate's research aims to introduce a new approach, which is based on a rational selection of surfactants after an in-depth study of the mechanisms of solubilization and the relationship between the molecular structure of surfactants/drugs and solubilization capacity. The conclusions are of scientific and theoretical nature and provide an in-depth overview of the micelle solubilization process in the context of pharmaceutical technology and biopharmacy.

Another area widely represented in the scientific works of the candidate are lipid dosage forms as a modern approach to increase oral bioavailability. In his experimental work, the candidate focuses on the study of the influence of the lipid carrier and the size of the oil droplets on the drug release profile in an in vitro model of the gastrointestinal tract. Moreover, in search of an optimal approach for obtaining a stable emulsion dosage form, the candidate conducts a number of studies on the interfacial properties of lipid- and protein-containing natural emulsifiers and proposes an innovative method for obtaining emulsions based on cyclic melting / hardening of coarse emulsion .

A significant share in the scientific production of the candidate is occupied by the publications aimed at the application of biopharmaceutical methods for research of excipients and bioactive compounds. The in vitro model of the gastrointestinal tract developed by the applicant and his collaborators not only allows in-depth study of the mechanisms controlling the release, dissolution and membrane permeability of the active substance, but can also be successfully used to determine the bioaccessibility of bioactive substances and toxins ingested with food. In this sense, this direction is of significant scientific and applied nature.

The results of the research work of Ch. Asst. Prof. Zachary Vinarov were presented at 40 scientific forums. Evidence certifying the type of scientific forums is not provided with the documents for this competition, therefore it is impossible to differentiate the international participations from the national ones. The topic of scientific communications overlaps that of publications, which shows the systematic scientific development of the candidate in the direction of this competition. The presentation of the majority of scientific communications (38 out of 40) in the form of oral presentations is impressive, testifying wide publicity of the candidate's activity.

The applicant has submitted a list of participations in projects (19 in total), in 1 of them Zachary Vinarov is the project leader, and in the others he is a member of the scientific team. The candidate's great engagement in joint research projects with industrial partners, mainly from abroad, makes an extremely good impression, which testifies to the scientific and applied nature of his research work.

The documents reflecting the scientometric indicators of the candidate show his high scientific activity, reflected in valuable scientific publications with a total impact factor of 113. In 70% of the publications the candidate is the first or leading author, and a significant part of the scientific works are the result of joint work with foreign researchers. As a member of international teams, Zachary Vinarov has been actively working for the last 2 years in the direction of searching for innovative solutions to current problems. In addition, the applicant is a member of expert group 13H (oils and their derivatives, polymers) at the European Pharmacopoeia and the American Association of Pharmaceutical Researchers (AAPS). All this gives me reason to believe that Zachary Vinarov is a scientist, well recognized among the research community both in the country and around the world.

IV. Assessment of the monograph submitted for participation in the competition

To participate in the competition, the candidate has submitted a monograph "Solubilization: fundamental principles and biopharmaceutical applications" in a volume of 153 pages, with scientific review by two established specialists in the field, and with a comprehensive bibliography, including 288 literature sources. The monograph is of significant scientific value, as it not only confirms the accumulated knowledge about the dependence of the micelle solubilization process on the structure of drugs and surfactants, but also upgrades with new knowledge and comparisons with the literature. The structure of the monographic work includes an introductory part, which aims to systematize the knowledge in the field in the context of pharmaceutical technology and biopharmacy. The significance of the method for increasing the solubility of hydrophobic drugs is outlined, key factors, processes and analytical methods are considered. For the essential part, the paper focuses on the main mechanisms of micelle solubilization, as the conclusions made are based on both own experimental data and in-depth analysis of the literature.

V. Citation of the applicant's publications in the literature

Testimony of the quality of the scientific production of the candidate is the reflection of his scientific works in the literature. In the competition, the candidate submitted a reference for 319 citations (excluding the self citations of all authors), and only for the current year at the time of preparation of the reference they are 98. The H-index of the candidate is 10 (according to SCOPUS). All citations in scientific journals are referred in SCOPUS. A total of 20 publications were cited, and it should be noted that the cited journals are among the most prestigious in the field of pharmaceutical sciences – *Pharmaceutics* (IF 6.321), *Advanced Drug Delivery Reviews* (IF 13.3), *International Journal of Pharmaceutics* (IF 5.875), *European Journal of Pharmaceutics and Biopharmaceutics* (IF 5.571), *Drug Delivery and Translational Research* (4.617), etc.

VI. Teaching activities assessment

The teaching experience of Zachary Vinarov according to the presented reference is a total of 10 years, of which 2 years as an assistant professor and 3 years as a chief assistant professor in the scientific specialty of this competition (Pharmaceutical technology and biopharmacy). The

teaching activity of the candidate includes seminars and practicals in Chemical Kinetics for bachelor students in Chemistry from the Faculty of Chemistry and Pharmacy; lectures on Dispersions in Pharmaceutical Technologies to Master's students in Chemistry; practicals in Pharmaceutical technology for Pharmacy students from Faculty of Chemistry and Pharmacy.

Teaching engagement of the candidate for the period 2014 - 2019 counts a total of 2766 hours, as the distribution by years is as follows:

- 383 hours of teaching in academic year 2014/2015;
- 548 hours of teaching in academic year 2015/2016;
- 545 hours of teaching in academic year 2016/2017;
- 543 hours of teaching in academic year 2017/2018;
- 747 hours of teaching in academic year 2018/2019.

The predominant part of the teaching activities (91%, 2520 hours) is related to conducting practicals in Pharmaceutical technology part I.

Ch. Asst. Prof. Zachary Vinarov meets the requirement for teaching experience in the scientific specialty of the competition. The average study load of the candidate significantly exceeds the norm for a non-habilitated lecturer.

The candidate demonstrated a high commitment to the education of students, which led to the development of 4 master theses (2 of which for foreign students under the Erasmus program) and 1 bachelor thesis, and the joint work with students resulted in 7 scientific publications in impact factor journals. Zachary Vinarov has contributed to the implementation of mobility abroad of three Pharmacy students (student internship at DSM Biomedical, the Netherlands, 2019; research visit to the University of Southern Denmark, Denmark, 2019 and the University of Copenhagen, Denmark, 2017).

All the above gives me reason to give a high grade of the teaching activities of the candidate Zahari Vinarov.

VII. Critical notes and recommendations

I do not have any critical notes for the applicant.

VIII. Overall assessment of the applicant's compliance with the mandatory quantitative criteria and scientific indicators

According to the analysis of all materials on the competition and from the submitted self-assessment report, the candidate Zachary Vinarov fulfills the minimum national requirements according to the Regulations for application of the Act for the Development of the Academic Staff in the Republic of Bulgaria, meets and significantly exceeds the criteria for holding the academic position of "associate professor" in the professional area 7.3. Pharmacy.

Minimum national requirements under Art. 2b of Act for the Development of the Academic Staff in the Republic of Bulgaria for the academic position "Associate Professor" and indicators of the candidate Zachary Vinarov

Group of indicators	Indicator	Minimum national requirements	Applicant's indicators
A	Indicator 1: Doctoral thesis	50	50
B	Indicator 3. Monograph	100	100
C	Indicator 6. Published book based on a defended dissertation for the award of PhD degree		40
	Indicator 7. Publications in scientific journals, referenced and indexed in renowned databases of scientific information (SCOPUS, WoS)		163
	Total for group of indicators C	200	203
D	Indicator 10. Citations in scientific journals, referenced and indexed in world-famous databases	50	4785
E	Indicator 16. Participation in a national scientific or educational project		15
	Indicator 17. Participation in an international scientific or educational project		340
	Indicator 18. Management of a national scientific or educational project		30
	Total for group of indicators E	-	385

IX. Conclusion

Chief Assistant Professor Zachary Vinarov is a specialist with a wide range of scientific interests and solid teaching experience. His research activity has a wide thematic scope and is focused on topical issues in pharmaceutical science. His scientific works contain valuable scientific and applied contributions. According to the materials and documents submitted to me for review, I believe that all mandatory indicators of the criteria to the current minimum requirements have been met, and some have even been significantly exceeded.

Based on my general assessment, I believe that Ch. Asst. Prof. Zachary Vinarov meets all the requirements for holding the academic position "Associate Professor", reflected in Act for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation and according to the Regulations for acquiring scientific degrees and holding academic positions at Sofia University "St. Kliment Ohridski".

In view of the above, I confidently give my **positive opinion** and propose to the esteemed Scientific Jury Ch. Assistant Professor Zahari Vinarov to be elected to the academic position of "Associate Professor" in "Pharmaceutical technology" in the professional field 7.3. Pharmacy at the Department of Engineering Chemistry and Pharmaceutical Engineering at Sofia University "St. Kliment Ohridski".

10.11.2021

Plovdiv

Reviewer:


(Assoc. prof. Bissera Pilicheva, PhD)