

R E V I E W

Regarding: competition for the academic position of "ASSOCIATE PROFESSOR " in "Technology of dosage forms and biopharmacy" in the field of higher education 7. "Health care and sport", in professional direction 7.3. "Pharmacy" and scientific specialty "Technology of dosage forms and biopharmacy" at the Department of "Pharmaceutical Sciences" of the Faculty of Pharmacy of the MU - Plovdiv, announced in the "State Gazette", no. 19/28/02/2023

Reviewer: Prof. Nikolay Georgiev Lambov, Ph.D. - Department of "Pharmaceutical Technology and biopharmacy" of the Faculty of Pharmacy at MU – Sofia

Only one candidate has submitted documents for participation in the competition - "ASSOCIATE PROFESSOR " Senior assistant Plamen Dimitrov Katsarov, Ph.D. from the Department of "Pharmaceutical Sciences" of the Faculty of Pharmacy at MU-Plovdiv, for the needs of which it is announced.

By order No. R 1182/05May2023 of the Rector of MU-Plovdiv, a scientific jury was appointed, which at its first meeting on 10May2023 designated me as a reviewer.

The submitted materials on an electronic device **comply with the legal requirements** and Art. 108 of the current Regulations on the terms and conditions for acquiring scientific degrees and occupying academic positions at MU-Plovdiv, 2021. All deadlines for conducting the competition have been met.

Candidate's career profile

Sen. Assist. Plamen Katsarov was born in 1986. He completed university education in Pharmacy in 2012 at the Faculty of Pharmacy of the Medical University of Plovdiv and acquired the educational and qualification degree "master pharmacist" (diploma No. 199 dated 08.03.2012).

Since 2012, he has been an assistant, and since 2018 - a senior assistant in the Department of "Pharmaceutical Sciences" of the Faculty of Pharmacy at the Medical University of Plovdiv, where he has been working in this position until now.

In the meantime, he worked as a Master Pharmacist in an open-type pharmacy from 2013-2019, and in the period 2016-2019, he was a researcher at the Technological Center for Emergency Medicine. From 2020 until now he has been a researcher at the direction "Pharmaceutical Innovations and Personalized Medicine" at the Scientific Research Institute of MU-Plovdiv, and from 2023 until now he is a senior associate in the sector of scientific research in the field of medical sciences under the structural unit "Strategic Research Program and innovations for the development of MU-Plovdiv", category of analytical specialists to the research group on "Biomaterials and nanostructures for drug delivery".

In the period 2013-2017, Sen. Assist. Pl. Katsarov is a PhD student in the PhD program "Technology of dosage forms and biopharmaceutics", which is in the direction of the competition. In 2017, she defended her thesis "Polymer microspheres with doxylamine and pyridoxine for nasal administration" and received the PhD in "Technology of dosage forms and biopharmacy" (diploma No. 217-DM dated 02Oct2017).

Raising his qualification Sen. Assist. Pl. Katsarov has acquired in 2018 a postgraduate qualification in "Technology of medicines with biopharmaceutics" (diploma reg. № 021822 from 26Jun2018).

Sen. Assist. Pl. Katsarov has participated in a number of additional training courses, including a seminar in the laboratories of the company Büchi, Switzerland and has conducted training under the Erasmus+ program at the University of Bratislava, Slovakia.

The last attestation of Sen. Assist. Pl. Katsarov for the period 2019-2021 has the highest grade - "very good".

The above clearly shows that Sen. Assist. Plamen Katsarov fully meets the requirements of Art. 107 of the current Regulations on the terms and conditions for acquiring scientific degrees and holding academic positions at the MU-Plovdiv for holding the academic position of "associate professor":

- has obtained the PhD degree, which is of the same specialty as the announced competition;
- held the academic position of "assistant" and "senior assistant" for more than two years.

Teaching activity

Sen. Assist. Pl. Katsarov conducts practical exercises in the disciplines "Technology of dosage forms" Part I and II and "Biopharmaceutics and Pharmacokinetics" to students-pharmacists studying in Bulgarian and English and participates in the conduct of practical and semester examinations in the taught disciplines. He also teaches "Pharmaceutical Calculations". At the same time, he lectures and conducts practical exercises on "Technology of Medicines and Biopharmaceutics" to students in the specialty "Associate Pharmacists" of the Medical College of Medical University of Plovdiv.

The academic workload of Sen. Assist. Pl. Katsarov in the last 3 academic years has been impressive - **2527.3 hours**, of which 230 hours of non-auditory employment (preparation of study materials, counseling of students).

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Sen. Assist. Pl. Katsarov participated in examination committees in competitions for the position "Assistant" at the Department of "Pharmaceutical Sciences" and competition and the non-academic position "Teacher" at the Medical College of MU-Plovdiv.

Sen. Assist. Pl. Katsarov is responsible for teaching and distance learning in the Department of Pharmaceutical Sciences. He is also the academic responsible of the students under the project BG 05M20P001 - 2,013-001 "Student Practice" - Phase 1 and Phase 2 of the Ministry of Education and Science at MU-Plovdiv.

Summarizing the educational and teaching activities of Sen. Assist. Plamen Katsarov, I can categorically define him as a well-established and constantly developing teacher who fully meets the requirements of the Regulations for the conditions and procedures for acquiring scientific degrees and holding academic positions at the MU-Plovdiv for holding the academic position "associate professor":

- has 10 years and 6 months of teaching experience;
- has acquired a specialty in the subject of the competition;
- has 2527.3 hours of teaching activity for the last three academic years.

As a result, the candidate collects 1119.5 points from teaching activity with 560 points based on the Regulations for Academic Development of MU-Plovdiv (Annex 1, Table 1.2. direction 7.1. Pharmacy).

Scientific research activity

Sen. Assist. Pl. Katsarov is the co-author of **26 original articles in scientific journals** published that are not included in the dissertation work. Of these, **13** are in refereed and indexed scientific journals in world databases with scientific information - Scopus and/or Web of Science. The remaining 13 articles were published in non-refereed journals, 5 of which in foreign journals. The very high level of some journals - Marine Drugs (IF=6.085), Viruses (IF=5.818), Molecules (IF=4.927) and Polymers (4.967) is striking. The candidate also participated as the author of a chapter in the collective monograph "Innovative medicinal carriers" 2015 (ISBN 978-954-91660-8-8).

12 of the publications of Sen. Assist. Pl. Katsarov are in journals with "impact factor" (Citation overviews - Scopus) **his total "impact factor" of them is 36.671.**

From the submitted reference from the "Library and Information Center" of MU-Plovdiv it is evident that the total number of citations of the publications of chief asst. Pl. Katsarov as of 11Apr2023 are 128. A review published in Polymers 2020,12(10):1-25 has a remarkable 67 citations to date. H-index (Scopus) is satisfactory - 7.

Sen. Assist. Pl. Katsarov is co-author of the **monograph** "Polysaccharide Microcarriers for Drug Delivery", 2023 (ISBN 978-619-189-217-4) with two reviewers. (Protocol from FS No. 3 of 26Apr2023). The monograph also presents own research on the development of chlorhexidine chitosan microparticles, the microencapsulation of essential oils (lavender and peppermint) in microcapsules coated with gum Arabic and maltodextrin for oral administration, and the isolation and analysis of 2 polysaccharides (alginate and fucoidan) contained in Bulgarian brown seaweed.

The candidate has been a participant in **11 national and educational projects**, of which 2 funded by the Ministry of Education, 5 intra-university projects at MU-Plovdiv, 1 funded by the EU (NextGeneration EU) № BG-RRP-2.004-007-C01, 3 funded by the EU through the European Structural Investment Funds and the European Social Fund.

Sen. Assist. Pl. Katsarov is a guest editor of the special issue "Polymers for Controlled Targeted Drug and Gene Delivery" of the journal "Polymers".

The scientific research work of Sen. Assist. is mainly in the field of creation and characterization of microdimensional drug-delivery systems with modified release of active substances in order to optimize their therapeutic effectiveness.

The main scientific and applied contributions reflected in the scientific publications represent a significant contribution to pharmaceutical science and practice and could be summarized as follows:

1. Preparation and characterization of polymeric microcarriers as drug-delivery systems

✓ polymeric microspheres containing equivalent amounts of two active substances (doxylamine and pyridoxine) coated with chitosan cross-linked and non-cross-linked with glutardelhyde were prepared for the first time by the spray-drying method. The process conditions (temperature, drying gas supply rate, injection rate) that provide high loading efficiency, good mucoadhesive properties and delayed release of model drug substances with minimal "burst" effect were derived. The prepared microparticles may find practical application in nasal administration.

✓ polymeric microparticles with chlorhexidine for buccal application were prepared, wherein chitosan was again used as a wrapping agent by the spray-drying method. The optimum process conditions ensuring high loading were determined. Delayed in vitro release of the active substance was achieved by crosslinking the polymer with different concentrations of glutaraldehyde. The effects of the crosslinking agent on polymer swelling and mucoadhesion were investigated. The results obtained highlight chitosan microparticles as a promising form for buccal application. In this regard, a tablet dosage form based on the optimal microparticle model was developed. The influence of different excipients - microcrystalline cellulose and sodium alginate was investigated

✓ microencapsulation of essential oils (lavender and mint) with natural polysaccharides by the spray drying method. The aim is to increase the stability of essential oils and their inclusion in solid dosage forms. Combining two polysaccharides - gum arabic and maltodextrin leads to compaction of the capsule wall and improvement of the morphological characteristics of the obtained microcapsules. The technological conditions ensuring a high yield and a high content of essential oils in the microcapsules are derived. As a result of the conducted in-depth technological studies, the possibilities for including liquid, volatile substances in solid microparticles, which can find practical application in the development of solid dosage forms, have been outlined.

2. Extraction of polysaccharides from plant raw materials and their characterization

Based on the wide application of natural polysaccharides in view of their indisputable qualities, both in pharmaceutical technology (e.g. as carriers in micro-sized drug delivery systems) and their pharmacological properties (antitumor, immunomodulatory, antioxidative, etc.) the candidate is directed towards optimization of the methods for extracting some of their representatives from Bulgarian brown algae.

✓ Alginate was isolated from *Cystosteria crinita* algae by means of acid extraction at elevated temperature and subsequent alkalization and precipitation with ethanol. For the first time, the chemical composition of the obtained product was established using state-of-the-art methods (FTIR, SEC-MALS and ¹H-NMR) and its inflammatory effects were established in a rat model of acute peritonitis. The obtained results outline the obtained alginate as a suitable polymer in the development of micro- and nanostructures with anti-inflammatory action.

✓ A fucoidan was isolated from brown algae of the species *Ascophyllum nodosum* by water extraction. As a result of extensive studies, the parameters of the technological regime guaranteeing high yield were derived. Preliminary removal of pigments, lipids and phenolic compounds with different extractants by five different methods was found to guarantee an increase in yield.

✓ Isolation and analysis of polysaccharides from the leaves of the genus *Plantago* and their structure was proved by HPAEC, SEC-MALLS and FTIR. For the first time, enzymatic hydrolysis of the isolated polysaccharides was carried out and the prebiotic potential of the obtained low molecular weight fractions against some strains of lactic acid bacteria, as well as their antioxidant activity, was determined.

3. Development and validation of UV methods for quantitative analysis of drug substance combinations

Applying modern chemometric separation techniques (PLS, MCR-ALS, NAS), methods were developed and validated for the quantification of doxylamine and pyridoxine in mixture, of paracetamol, propiphenazone and caffeine in mixture (Saridon® drug product, Bayer), and of enalapril in different media (artificial saliva and artificial gastric juice).

The scientific-metric indicators of Sen. Assist. Pl. Katsarov significantly exceed the minimum national requirements specified in Annex 1, Tab. 1.2. of the Regulations for Academic Development at MU-Plovdiv

for the academic position "Associate Professor" in the professional field 7.3. "Pharmacy" - with the maximum number of points **1270**, the candidate has **3642.17 points**.

The values of the main groups of indicators are presented in the table:

Group	Number of points by indicators	Number of points of Sen. Assist. Pl. Katsarov
A	50	50
B	100	100
C	210	247.67
D	300	1920
E	50	205
F	560	1119.5
Total number of points	1270	3642.17

Summarizing the results of the scientific-research work and the scientific-metric indicators of the Sen. Assist. . Plamen Katsarov can be made the categorical conclusion that they demonstrate his significant achievements in the field of pharmaceutical technology and fully satisfy the requirements of the Regulations on the conditions and procedure for the acquisition of scientific degrees and occupation of academic positions at MU-Plovdiv for occupation of the academic position "Associate Professor":

- 26 scientific publications, 11 of them in journals with IF - on request, 10 and 6, respectively;
- 128 citations in foreign scientific journals IF, with requirement 12;
- 11 scientific projects, under requirement 2;

As a result, the candidate collects a total of 2292,1 points from research activities according to the criteria of the Regulations for Academic Development of MU-Plovdiv (Annex 1, Table 1.2. direction 7.1. Pharmacy) at **560 points**.

CONCLUSION

As a result of everything stated above, I firmly believe that Sen. Assist. Professor Plamen Katsarov fully meets the conditions under Art. 107 of the Regulations on the terms and conditions for acquiring scientific degrees and occupying academic positions at MU-Plovdiv for the occupation of the academic position "ASSOCIATE PROFESSOR", as well as the minimum requirements specified in sections 3 and 4.

- has obtained a PhD in 2017, which is in the same specialty for which the competition was announced;
- held the academic positions of "assistant" and "senior assistant" for more than 2 years (since 2012);

- is a co-author of a monographic work with 2 reviewers, which does not repeat the presented materials for acquiring the PhD;

- significantly exceeds the minimum national requirements and the requirements under Art. 2b, para. 2 and 3, respectively, to the requirements under Art. 2b, p. 5 of the ZRASRB and the requirements specific to MU-Plovdiv under direction 7.1 "Pharmacy" for the occupation of the academic position "Associate Professor" ((Appendices 1, table 1.2.).

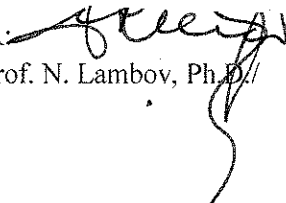
- There is no proven plagiarism in scientific works according to the law

Taking into account the pedagogical qualities and skills, the long-term experience in teaching students, as well as the high value of scientific achievements, I firmly believe that Sen. Assist. Plamen Dimitrov Katsarov, Ph.D fully meets the requirements for acquiring the academic position of "ASSOCIATE PROFESSOR" at the Department of "Pharmaceutical Sciences" of the Faculty of Pharmacy of the Medical University of Plovdiv, and I express my full support for his candidacy.

Заличено на основание
Чл.5 §1, б. "В" Регламент (ЕС) 2016/679

Sofia, May 29th 2023

REVIEWER:


/Prof. N. Lambov, Ph.D./