

STATEMENT

by Assoc. Prof. Dr. Teodora Angelova Ivanova,

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Member of the scientific jury for the selection of Associate Professor in 4. Natural Sciences, Mathematics and Informatics, 4.3. Biological sciences, scientific specialty "Genetics" at the Laboratory "Regulators of Plant Growth and Development", Institute of Plant Physiology and Genetics – Bulgarian Academy of Sciences (IPPG).

Subject: The competition for the academic position "Associate Professor", announced by is announced in State Gazette No. 16/25.02.2025, there is only one candidate - Dr. Maria Ivanova Petkova, Senior Assistant at Laboratory "Regulators of Plant Growth and Development" at IPPG.

The materials submitted for the competition are done in accordance with the current legal requirements: the Law for the Development of Academic Staff in the Republic of Bulgaria and the relevant Regulations for its implementation at national level, those of the Bulgarian Academy of Sciences and the Regulations on the specific conditions and procedure for the acquisition of scientific degrees and the occupation of academic positions in the IPPG.

General information on the applicant's career and thematic development

Dr. Petkova is a graduate of St. Kliment Ohridski", Faculty of Biology, Master in Biology and Chemistry, Specialization in Medicinal Plants (2001). She her degree Doctor in Genetics (01.06.06) for the dissertation "Biotechnological approaches for propagation and biomass production from hairy roots in *Arnica montana* L." from the IPPG in 2014. Since 2003 works at the Bulgarian Academy of Sciences (Institute of Genetics "Acad. Doncho Kostov", now Institute of Plant Physiology and Genetics), with main topics of interest - biotechnology of medicinal plants, *in vitro* synthesis of biologically active substances (BAS); genetic manipulations to optimize productivity of medicinal and aromatic plants. In the period 2003-2023 she co-authored 52 publications with total number of 425 citations (39 cited publications), h-index (without citations): 9. The candidate has one short-term specialization in Finland related to Bovin β -lactoglobulin production in plants and plant cell cultures. She has taught short-term in the framework of Practical Training in *In Vitro* Cultivation of Medicinal Plants to a postdoctoral fellow from the University of Life Sciences, Lublin, Poland

Assessment of the submitted applicant's performance reference

The dissertation work (Group A) together with three publications in specialized journals with impact factor and one in the proceedings of a scientific forum are fully reflect the of the dissertation and satisfy the requirements for the acquisition of the degree Doctor in Genetics (PhD).

In the current competition for the academic position of Associate Professor the candidate participates with 6 scientific publications, replacing the habilitation thesis (Group B, 125 points, min. 100 points required). Distribution of publications by quartiles (Scopus) is as follows: Q1 - 3, Q2 - 2, Q3- 1, in SJR publication without IF with total JCR IF: 14.834. Of the above-mentioned publications, M. Petkova is the first or corresponding author of 2 (35 items, JCR IF 4.0). The candidate is also listed as the responsible author in the conceptualization of her last article (B4-2). These papers cover *in vitro* cultivation, assessment of morpho-physiological and biochemical status of tissue culture and *ex vitro* regenerants, genetic control and optimization of biosynthesis of metabolites from three economically important medicinal plants (*Arnica montana*, *Stevia rebaudiana* and *Echinacea purpurea*), which shows the clearly outlined profile of the candidate's research activity.

Fifteen scientific publications were submitted to indicator group "Г", resulting in 232 points obtained for 13 of them (4 in Q1, 3 in Q2, 2 in Q3, 1 in Q4, 3 in SJR without IF points), minimum required is 220. M. Petkova is the first or corresponding author of 8 of the submitted articles, corresponding to 110 points, which fulfils the specific requirement of IPPG for this indicator group.

For the indicator group Д - a total of 252 citations, excluding self citations, were found for 37 publications of the candidate. A list of 174 citations from the last 5 years (348 points, with a minimum of 100) in publications indexed in WoS and/or Scopus is provided.

For indicator group E, the IPPG requires at least 70 points from research projects activities. The applicant has submitted a list of participation in 7 national and 1 international research or education project (90 points) and is currently leading 1 project at the Research Fund (20 points). For the last one M. Petkova also received 63 points in indicator F-18 for the obtained funding.

Analysis of the candidate's research work and personal contribution

The list of publications, participation in projects and scientific forums presented for the competition demonstrate M. Petkova's serious engagement in exploration of medicinal plants of Asteraceae family, namely in two directions 1) Development and optimization of *in vitro* protocols for propagation, biomass production and biosynthesis of BAS and 2) modulation of BAS synthesis by gene transfer or application of abiotic and biotic elicitors. The species which have been the subject of the candidate's work (e.g. *Arnica montana* L. - 10 publications, *Stevia rebaudiana* Bertoni - 4 publications, *Helichrysum arenarium* (L.) Moench - 1 publication, *Echinacea purpurea* (L.) Moench - 1 publication, and *Cichorium intybus* L. - 1 publication) are among the widely used medicinal plant species of the Asteraceae family, applied both in traditional and biomedical practices. The development and optimization of tissue culture initiation and accelerated micropropagation protocols are important for the efficient production and conservation of biomass and planting material from plant species with reproductive issues, slow growth or for rapid introduction into culture of valuable wild genotypes and varieties with improved characteristics. New data are presented on the impact of explant selection and different components of agar media and liquid nutrient media in the TIS bioreactor system, combined with different approaches to reduce culture costs and develop efficient *in vitro* storage schemes. The multifaceted study and

interdisciplinary approach of the research is noteworthy, aiming to uncover opportunities to assess the genetic stability of the cultures and to enhance the biosynthesis of BAS. The candidate has planned and carried out experiments on micropropagation, establishing optimal nutrient environments and conditions for crop growth and development, stimulating and directing the biosynthesis of valuable metabolites by genetic transformation and by applying different types of elicitors. Maria Petkova is the first and/or corresponding author of 10 of the presented papers, which testifies to her leading role in the development of the concepts of the presented studies and her active participation in the other research activities (processing and analysis of plant materials and results obtained from biochemical, phytochemical and cytogenetic analyses of the studied objects).

Significance and relevance of the scientific topic and opportunities for development

Research on *A. montana* is a continuation of the thesis topic of M. Petkova, which is ongoing work in the framework of the research project she is leading. The presented contributions to the biology and phytochemistry of the studied plant species are of both scientific and fundamental nature. Given the growing interest in the use of active substances of a natural origin both in the field of pharmaceutics and in food production, including functional foods, I am convinced that new knowledge and technological optimizations ensuring higher and environmentally sustainable yields will find increasing application in practice. Currently M. Petkova supervises the thesis work of two graduates (one bachelor and one master) from the Sofia University, which is a promising prerequisite for the development and expansion of the activities of the Laboratory “Regulators of Plant Growth and Development” at the IPPG.

Notes and recommendations

I recommend updating the information on the conservation status of the plant species, in accordance with the European Red List of Medicinal Plants (EC DG Environment, IUCN, 2014, <https://data.europa.eu/doi/10.2779/907382>) and Volume 1 of the Red Data Book of Bulgaria (BAS/MOEW, 2015 <https://www.moew.government.bg/bg/priroda/chervena-kniga-na-republika-bulgariya/>).

In conclusion, the Dr. Maria Petkova fully meets and exceed the minimum national requirements and the minimum requirements of Bulgarian Academy of Sciences and IPPG for awarding academic position Associate Professor. Based on candidate's merits and recent work, I confidently declare my positive evaluation for the selection of Dr. Maria Ivanova Petkova as Associate Professor in Genetics at the Laboratory “Regulators of Plant Growth and Development” at the IPPG - BAS.

13.05.2025

Sofia

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/Assoc. Prof. Teodora Ivanova, PhD/