Вх. № 957-НО-05/21.11.2023

STATEMENT

Assoc. Prof. Ina Yosifova Aneva, PhD
at the Institute of Biodiversity and Ecosystem Research - BAS,
Scientific secretary of the division „Biodiversity, bioresources and ecology“ of the
BULGARIAN ACADEMY OF SCIENCES,
appointed as a member of the scientific committee, according to Order No. 75/06.10.2023
of the Director of IBER – BAS,
regarding the procedure for awarding the educational and scientific degree of PhD
in scientific speciality “Botany”,
Thesis theme: “Biotechnological Approach for Conservation and Cultivation of Licorice
(*Glycyrrhiza glabra* L.), Fabaceae”
PhD Student: **ASYA PAVLOVA KOZHUHAROVA**,
Scientific advisors: Prof. Marina Stanilova, PhD
Prof. Strahil Berkov, PhD

The presented doctoral dissertation is dedicated to a current and significant topic, encompassing a series of logically organized scientific studies that build a comprehensive biotechnological approach to the conservation of one of the rare and valuable medicinal plant species in our flora - *Glycyrrhiza glabra*. The dissertation fully complies with the Act for the development of Academic staff in Bulgaria (ADASB) as well as with the Regulations of the Development of the Academic staff of the IBER – BAS.

Brief biographical data about the PhD student

Asya Pavlova Kozhuharova is a graduate master from Plovdiv University "Paisii Hilendarski" in the field of "Medicinal and Aromatic Plants." Her interests are related to the application of biotechnological methods for the accelerated propagation of rare and protected medicinal plant species. She has participated in the implementation of ten research projects and has presented the obtained results at scientific forums in Bulgaria and abroad. She is one of the authors of six scientific publications, three of which are related to the topic of the PhD dissertation. During her work as a regular PhD student, Asya Kozhuharova has also undertaken a

short mobility program at the Institute of Biology of the Romanian Academy, expanding her knowledge of initiating somatic embryogenesis from cells of different tissues.

General characteristics of the PhD dissertation

The dissertation is presented in 130 pages, structured in a classical manner, including all necessary sections for a comprehensive biotechnological study. The distribution of individual parts is as follows: introduction – 2 pages, literature review – 25 pages, materials and methods – 13 pages, results and discussion – 59 pages, conclusion, findings, and contributions – 12 pages, and a bibliography of 19 pages. This demonstrates a well-balanced content, with the main emphasis on the section presenting the results, their discussion, along with the conclusions drawn.

The aim is clearly formulated, and the set of 8 tasks provides a good foundation for structuring the work and achieving significant results. The inclusion of additional studies beyond the planned tasks is particularly impressive, expanding the doctoral candidate's perspective and leading to more in-depth analyses of the obtained results.

A total of 204 literature sources are cited, demonstrating the excellent preparation of the doctoral candidate and in-depth knowledge of the problem. The literature review provides a detailed overview of previous studies. A wide range of methods has been used, significantly enhancing the qualification of the doctoral candidate and expanding the possibilities for conducting diverse research. Field studies, biotechnological, phytochemical, and soil analyses have resulted in original data and present a comprehensive, interdisciplinary approach to the conservation of medicinal plant species, simultaneously providing raw materials for the pharmaceutical industry. Modern statistical methods and specialized software (Anova Single factor, Anova: Two-Factor With Replication) were used for the processing and analysis of the results. An advantage of the dissertation is the high practical applicability of the scientific results obtained – they provide a stable foundation for the scientifically based cultivation of an extremely valuable medicinal plant species, whose populations have significantly decreased.

The dissertation is beautifully illustrated with photos and well-made graphs, further clarifying the completeness of the conducted research. The conclusions are logically drawn and accurately reflect the professional interpretation of the results. The contributions of the dissertation are significant and confirm the scale of the study. The obtained results are reflected

in three publications, one of which is in an impact factor journal. Four citations have been noticed.

The personal contribution of the doctoral candidate is most strongly expressed in the study of the reproductive characteristics of the species and its introduction into culture. The created protocol for accelerated propagation of *Glycyrrhiza glabra* through the application of biotechnological methods has high scientific and applied significance. The ex situ collection of licorice, originating from the natural habitats of the species in the country, propagated in vitro or vegetatively from stolon cuttings, is a great asset that will be used for future research.

The abstract corresponds to the content of the dissertation and thoroughly presents the main results and contributions. The extended abstract corresponds to the content of the dissertation and fully presents the main results and contributions.

Conclusion:

The presented PhD dissertation represents a complex and completed study that leaves significant scientific and applied contributions. In conclusion, based on the qualities of the doctoral dissertation, the proven scientific contributions, and the required indicators, I confidently propose to the esteemed Scientific Committee to support the award of the educational and scientific PhD degree to ASYA PAVLOVA KOZHUHAROVA in the professional field 4.3. Biological Sciences, scientific specialty "Botany" (code 01.06.03).

Sofia, 20.11.2023 Assoc. Prof. Ina Yosifova Aneva, PhD