

OPINION

by Assoc. Prof. Plamen Stefanov Stoyanov, PhD, University of Plovdiv “Paisii Hilendarski”, Faculty of Biology, Department of Botany and biological education

of PhD thesis for awarding the educational and scientific degree „Doctor“ in the field of higher education 4. Natural sciences, mathematics and informatics; professional field 4.3. Biological sciences; doctoral program Botany

Author: Tsvetelina Georgieva Andonova

Subject: Phytochemical and biological studies on the invasive for the Bulgarian flora plant species *Ailanthus altissima* (Mill) Swingle and *Koelreuteria paniculata* Laxm.

Scientific Supervisors:

Prof., Dr. Ivanka Zhecheva Dimitrova-Dyulgerova – University of Plovdiv “Paisii Hilendarski”

Assoc. Prof., Dr. Iliya Zhelev Slavov – Medical University - Varna

1. General presentation of the procedure and the Ph.D. student

By order № ПД-21-1788 from 08.11.2022 of the Rector of University of Plovdiv "Paisii Hilendarski" I have been appointed as a member of the scientific jury for participating in a procedure for the defense of a dissertation on „Phytochemical and biological studies on the invasive for the Bulgarian flora plant species *Ailanthus altissima* (Mill) Swingle and *Koelreuteria paniculata* Laxm.“ for obtaining the educational and scientific degree“ Doctor” in field of higher education 4. Natural sciences, mathematics and informatics; professional field 4.3. Biological sciences; doctoral program Botany. The author of the dissertation is Tsvetelina Georgieva Andonova - a full-time doctoral student in the Department of Botany and biological education at the Faculty of Biology of University of Plovdiv "Paisii Hilendarski" with scientific supervisors prof., Dr. Ivanka Zhecheva Dimitrova-Dyulgerova and assoc. Prof., Dr. Iliya Zhelev Slavov. According to the protocol of the first meeting of the scientific jury, I was assigned to prepare an statement on the dissertation.

The set of materials on paper and electronic media presented to me by Tsvetelina Andonova is in accordance with the Development of Academic Staff Regulation in the University of Plovdiv “Paisii Hilendarski”

Tsvetelina Andonova was born on August 18, 1976. In 2000 she graduated from the Faculty of Biology at the University of Plovdiv “Paisii Hilendarski, specialization in Microbiology and Genetics, Master's degree. From 2002 to 2007 she works as a laboratory technician at the physicochemical and microbiological laboratories in "Vinprom Peshtera" - Peshtera, and from 2008 to 2014 and from 2015 until now she is a biologist at few Departments of Faculty of Biology at the University of Plovdiv “Paisii Hilendarski.

On March 1, 2019, Tsvetelina Andonova was enrolled in a regular form of study in the doctoral program Botany at the Department of Botany and biological education, Faculty of Biology, University of Plovdiv "Paisii Hilendarski" and in 2022 she was deducted with the right of defense.

2. Relevance of the subject

Undoubtedly, the topic of the dissertation is relevant, as in recent years there has been a growing interest in medicinal plants used in both folk and official medicine. The importance of the topic of the dissertation is obvious from the fact that the object of study are the invasive species *Ailanthus altissima* and *Koelreuteria paniculata*. To date, invasive plants have been the focus of ecological research rather than as sources of biologically active substances.

3. Knowledge of the problem

The literature review covers 25 pages and it mainly presents the information available in the scientific literature on the phytochemical composition and biological activity of *Ailanthus altissima* and *Koelreuteria paniculata*. A total of 247 literature sources are cited in the dissertation, which shows that the doctoral student is well acquainted with the relevance of the research on national and global scale.

4. Research methodology

To achieve the goal - study of the phytochemical composition and some biological activities of plant substances from the alien to the Bulgarian flora *Koelreuteria paniculata* and *Ailanthus altissima* a wide range of methods have been used: spectrophotometric, chemical, physicochemical, chromatographic methods, as well as methods for studying some biological activities - antioxidant, antimicrobial, etc. All methods used are described in detail in the Materials and Methods chapter.

5. Characterization and evaluation of the dissertation work and contributions

The presented dissertation is represented at a high scientific level, following the standard structure for this type of development and is in accordance with Art. 32, para. 1 and para. 2 of the Development of Academic Staff Regulation in the University of Plovdiv "Paisii Hilendarski". The dissertation is written on 148 pages and illustrated with 25 figures and 21 tables. The conclusions and contributions formulated at the end of the dissertation are logical and correspond to the obtained results. Many of them are represented for the first time in the scientific literature as the establishment of basic diagnostic microscopic features of powdered plant substances from flowers, leaves and stem barks of *K. paniculata*, and flowers of *A. altissima*; investigating the seasonal dynamics in the accumulation of total water-soluble polyphenols, tannins, flavonoids and phenolic acids in plant substances from *K. paniculata* and *A. altissima*; isolation and identification of volatile components from aerial parts of *K. paniculata*; study of the phytochemical composition and different biological activities of ethanol extracts from fresh plant substances of *K. paniculata* and *A. altissima*; demonstration of DNA-protective potential of ethanolic extracts of flowers, leaves and stem barks of *K. paniculata*, as well as of flowers and leaves of *A. altissima*; indication of phospholipid profile of fatty oils from seeds of *A. altissima* and *K. paniculata*, etc.

6. Assessment of the doctoral student's publications and personal contribution

The doctoral student has presented 2 scientific publications related to the dissertation, in all of them she is a leading author, which is proof of her active participation in the elaboration and writing of the present work. The publications have been published in journals *Plants* and *Journal of Essential Oil Bearing Plants*. Both journals are referenced in international databases Web of Science and Scopus and respective Q1 and Q3 quartiles. A significant part of the results obtained were reported in two international scientific forums.

7. Summary of the dissertation

The content of the dissertation is correctly and completely represented in the summary of the dissertation.

8. Recommendations for future use of dissertation contributions and results

I recommend the doctoral student to continue the phytochemical and biological research of other invasive species distributed in Bulgaria, which are supposed to produce biologically active substances.

CONCLUSION

The presented dissertation work of Tsvetelina Georgieva Andonova and the publications to it correspond to Academic Staff Development Act in the Republic of Bulgaria, Regulation on the Implementation of the Academic Staff Development Act in the Republic of Bulgaria and Development of Academic Staff Regulation in the University of Plovdiv "Paisii Hilendarski". The dissertation contains scientific and scientific-applied contributions. My personal impressions as the head of the department where Tsvetelina Andonova works are that she is ambitious, executive and has acquired quite a few professional skills in the field of botany and phytochemistry, which will contribute positively to the scientific activity of the department.

This gives me reason to give my **positive assessment** and to propose to the esteemed scientific jury **to award** the educational and scientific degree "**Doctor**" to **Tsvetelina Georgieva Andonova** in the field of higher education: 4. Natural sciences, mathematics and informatics; professional field 4.3. Biological sciences; doctoral program **Botany**.

21.11.2022 г.

Prepared the statement:

Assoc. Professor Plamen Stoyanov, Ph.D.