

OPINION

by Academician Prof. Atanas Ivanov Pavlov, University of Food Technology, Plovdiv
of a dissertation for awarding the educational and scientific degree "**doctor**"

by : field of higher education : **4. Natural sciences, mathematics and informatics**

professional direction : **4.3. Biologically sciences**

doctoral program: **Biochemistry**

Author : Stanimira Angelova Angelova

Topic : "STUDY OF THE PROPERTIES OF BIOENGINEERED ALPHA-D-GLUCANS SYNTHESIZED BY MUTANT GLUCANSUCHARASE URE 13-300"

Research supervisor : Prof. Dr. Ilia Nikolov Iliev, Plovdiv University "Paisii Hilendarski"

1. General presentation of the procedure and the doctoral student

By order No. PD-21-2469 dated 18.12.2023 of the Rector of Plovdiv University "Paisii Hilendarski" (PU), I have been appointed as a member of the scientific jury to ensure a procedure for the defense of a dissertation work on the topic "Researching the properties of bioengineered alpha- D - glucans synthesized by mutant glucansaccharase URE 13-300 " for the acquisition of the educational and scientific degree 'doctor' in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.3. Biological Sciences, PhD program Biochemistry. The author of the dissertation is Stanimira Angelova Angelova - full-time doctoral student at the Department of Biochemistry and Microbiology, supervised by Prof. Dr. Ilia Nikolov Iliev from the Department of Biochemistry and Microbiology, Faculty of Biology, Paisii Hilendarski University of Plovdiv .

The set of paper materials submitted by PhD student Stanimira Angelova Angelova is in accordance with Art. 36, para. 1 of the Regulations for the Development of the Academic Staff of the PU, includes all the required documents.

The PhD student has attached 3 publications in scientific journals. She has declared 6 presentations of the results of her dissertation work at international scientific forums and participation in 5 scientific projects, one of which is international.

2. Brief biographical data about the doctoral student

Doctoral student Stanimira Angelova Angelova has a bachelor's degree in "Molecular Biology" from PU "Paisii Hilendarski" and a master's degree in " Biopharmaceutical Biochemistry" from the same university. Her work experience is related to Biovet Ltd, Peshtera (chemical analyst) and Technology Center, PU "P. Hilendarski" (researcher). A natural continuation of her career development is her full-time enrollment in doctoral studies from March 1, 2020, in the

"Biochemistry" doctoral program at the Department of "Biochemistry and Microbiology" at the Faculty of Biology of the University of Plovdiv.

3. Relevance of the topic

Plant-based polymers are particularly relevant in times of rethinking industrial production and the development of green technologies, as they are renewable and recyclable. Among the polysaccharides, the group of glucans stands out with its potential for multiple applications in the food, medical and cosmetic industries as value-added products. On the other hand, in recent years, a new scientific discipline has been formed, "Cellular Agronomy", a part of which is also Synthetic Biology. This area of biotechnology in Bulgaria is relatively underdeveloped, and this makes the research presented by PhD student Stanimira Angelova of particular interest to the scientific community working on the development of various aspects of cellular agronomy in our country.

4. Knowing the problem

The doctoral student presents an overview of the available literary material, prepared purposefully and specifically, and including all aspects of the study. The information presented in 175 scientific publications corresponding to all aspects of the conducted scientific research is analytically summarized. In general, this part of the dissertation can be defined as a work with encyclopedic elements that will be used by colleagues conducting future research in this area.

5. Research methodology

A variety of methods were used, tailored to the specific requirements of the experiment. They are both routine and modern analytical, molecular biological and biochemical. They are presented in a comprehensible way, enabling the correct conduct of the experiments and obtaining reliable results. In fact, this is the first dissertation I have reviewed in which the doctoral student demonstrates such broad methodological preparation – bioengineering methods, biochemical methods, molecular biological methods, including targeted mutagenesis, as well as chemical methods (HPLC and NMR). I would definitely like to have such a specialist in my labs.

6. Characterization and evaluation of the dissertation work and contributions

The experimental results and their discussion are presented in five parts. In each chapter, separately, PhD student Angelova presents very clearly and correctly what was done and discusses the obtained results in the necessary details, which is especially well done when presenting the results

regarding the directed mutagenesis for obtaining a mutant gene of the enzyme glycosyltransferase and studying the properties of the secreted enzyme from the mutant gene.

The conclusions are a logical consequence of the conducted experiments. They clearly and accurately present the results obtained.

In general, the presented scientific work of PhD student Stanimira Angelova is a serious study with an emphasized both theoretical and practical sound, whose main contributions can be defined as new for science and facts confirming previously stated theses, which, however, clearly outline the area of applicability of the presented results.

7. Evaluation of the publications and personal contribution of the doctoral student

The data from the dissertation have been presented to the international scientific community in 3 journal scientific articles, in refereed journals (Catalysts – Q2 ; Acta Microbiol. Bulgarian. - Q4; Ecol. Balk. - Q4). In addition, PhD student Angelova has presented parts of the development at 6 scientific forums. In the two main articles, Stanimira Angelova is the first author. The doctoral student is also the first author in the summaries of the materials presented at the scientific forums. This gives me reason to consider that the results in the dissertation, in their main part, are the work of the doctoral student.

The facts cited above meet and exceed the requirements of the RSASR and the relevant national and university regulations .

8. Abstract

The abstract is well structured and correctly presents what was done during the doctoral studies.

CONCLUSION

The dissertation *contains scientific and scientific-applied results, which represent an original contribution to science* and **meet the** requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of ZRASRB and the relevant Regulations of PU "Paisiy Hilendarski". The presented materials and dissertation results **fully** correspond to the specific requirements of the Faculty of Biology, adopted in connection with the Regulations of the PU for the application of the ZRASRB.

The dissertation shows that the doctoral student Stanimira Angelova Angelova **possesses** in-depth theoretical knowledge and professional skills in a scientific specialty professionally direction 4.3. Biologically sciences, Ph.D program "Biochemistry" as **demonstrates** qualities and skills for independent conduct of scientific research.

Due to the above, I confidently give my *positive evaluation* of the conducted research presented by the above-reviewed dissertation work, abstract, achieved results and contributions, and *I recommend to the honorable scientific jury to award the educational and scientific degree "doctor"* to

Stanimira Angelova Angelova in the field of higher education: 4. Natural sciences , mathematics and informatics , professional direction: 4.3. Biologically sciences PhD program Biochemistry.

16 . 02. 2024

Prepared the opinion :

Atanas Pavlov, Academician, Ph.D