

**REPORT**

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by Prof. Sevdalina Hristova Turmanova, PhD

Member of the Academic Jury set to render a decision on the competition for filling the academic position of a Professor in the Professional Area 5.11. Biotechnology, scientific specialty according to the Classifier of the Areas of Higher Education and the Professional Fields “Technology of biologically active substances (including enzymes, hormones, proteins)”, announced in SG, issue 70/20.08.2024

This Report is prepared in response to Order № RD-374/25.10.2024 issued by the Rector of the University „Prof. Dr. Asen Zlatarov” – Burgas. The Report is in compliance with Development of Academic Staff in the Republic of Bulgaria Act (DASRBA), the Rules for the Application of the Development of Academic Staff in the Republic of Bulgaria Act, and with the Rules set at the University „Prof. Dr. Asen Zlatarov” – Burgas, for applying the Act aforementioned.

1. General presentation of the procedure and characteristics of the candidate’s activities

The materials submitted for review for the sole candidate in the competition, Chief Assistant Dr. Galina Dimitrova Yordanova, contain all the necessary information for evaluation. The required documents are structured in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for its Application (PPZRASRB), the Regulations of the University "Prof. Dr. Asen Zlatarov" – Burgas, and meet the institutional criteria of the University "Prof. Dr. Asen Zlatarov" – Burgas for the academic position of "Associate Professor." Chief Assistant Dr. Galina Yordanova has submitted a total of 28 publications and a habilitation thesis – a monograph published by a Bulgarian publishing house. Of the 28 scientific works reviewed, 7 are in peer-reviewed and indexed scientific journals in global databases, and 21 publications are in non-peer-reviewed journals with scientific reviews. The scientific papers have been cited a total of 15 times in the international scientific community, with an *h*-index of 5. According to the indicator G, with the required minimum of 300 points, the candidate scores 309.03 points. For indicator D, Dr. Yordanova contributes 150 points, exceeding the requirement of 100 points. With the required minimum score of 650 points for the academic position of "Associate Professor," Dr. Yordanova has scored 709.03 points. As shown in the attached certificate, Chief Assistant Dr. Galina Yordanova has the necessary professional experience in the field, in accordance with the requirements for the initiation of this procedure. The biographical information presents the candidate as a proven researcher and academic teacher with well-defined scientific focus in the professional field and scientific specialty of the competition procedure. She justifies her motivation, reasons, and arguments for participating in the competition for the academic position of "Associate Professor" at the University "Prof. Dr. Asen Zlatarov" – Burgas, with which she has an ongoing labor relationship.

The leading role of Chief Assistant Dr. Galina Yordanova is demonstrated by her participation as the first and second author in the reviewed scientific publications. In the



current competition, Chief Assistant Dr. Galina Yordanova participates as an author and co-author in a total of 28 publications, being the first author in 14 and the second author in 10.

I firmly assert that Chief Assistant Dr. Galina Yordanova is a scientist with proven contributions to scientific activity, with a strong dedication to the development of science, and I acknowledge her leading involvement in research and published results. She is a leading lecturer for courses such as "Microbiology," "Biotechnology of Pharmaceutical and Agro-Biological Products," "Biotechnological Production," and others. She has successfully supervised the graduation of 10 students and is currently a tutor for first- and fourth-year students in the "Biotechnology" and "Food Biotechnology" programs. She is also a member of the committee for preparing and checking biology exam tests for the "Medicine" program. Dr. Yordanova's administrative experience includes participation in the Faculty Council of the Faculty of Technical Sciences, involvement as an academic mentor in the "Student Practices" project – Phases 1 and 2, training seminars, and scientific colloquia.

The set of documents submitted by the candidate includes additional materials in accordance with the criteria outlined by the relevant regulations.

I believe that Dr. Yordanova meets the requirements in accordance with the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its Application, and the Regulations for the Conditions and Procedure for Acquiring Scientific Degrees and Occupying Academic Positions at the University "Prof. Dr. Asen Zlatarov" – Burgas, and has the right to participate in this competition.

2. Main Contributions, Analysis, and Evaluation of the Scientific and Applied Scientific Contributions of the Candidate, and the Relevance of the Topic.

The scientific research activity of the candidate is entirely in line with the professional field for which the competition was announced. All scientific publications and the monographic work, consisting of ten chapters and 155 pages, demonstrate systematization and depth, logically continuing the main directions of the candidate's doctoral dissertation. Dr. Yordanova builds on her scientific work with new original ideas, innovative techniques, and approaches in the interpretation of the results obtained, as well as in the identification of patterns. The scientific community is presented with research that offers concrete results, which have the character of scientific and applied scientific contributions. These contributions can be summarized into four thematic areas in the field of biotechnology:

• Biodegradation of Phenol and Phenolic Derivatives with Immobilized Microbial Cells on Different Carriers

The scientific research in this area focuses on the covalent immobilization of cells from *Trichosporon cutaneum* and *Aspergillus awamori* onto two types of membranes using the crosslinking agent glutaraldehyde, in the presence and absence of phenol. The ability of both systems to degrade biophenol as the sole carbon and energy source has been assessed in batch experiments. Immobilization of the same cells on modified polyamide granules has also been performed. The synergistic effect of the two immobilized systems on the phenol and its derivatives degradation rate, compared to the individual immobilized systems of the two strains and free cells, has been demonstrated. The results are reflected in works G-2 and G-3.



• **Quality Control and Management in Various Food Laboratory Productions**

The author provides an algorithm for identifying and evaluating the calibration range of the densitometer used for milk and dairy products. An algorithm has been developed to analyze the reasons for production decline and has been applied to a company producing meat and meat products. A study has been conducted to improve the methodology and increase the competitiveness of a beer manufacturing company. Understanding the principles underlying the methodology and its application in both long-term and short-term plans can help other companies compete with their rivals on the path to operational excellence. In relation to the requirements of BDS EN ISO/17025 and BAS QR 18 for ensuring the authenticity of results, the candidate participates in the program for proficiency testing in microbiological analysis under the Quality in Microbiology PT Scheme/QMS for dairy matrices. The study focuses on the detection of Salmonella species. A new solution for incoming quality control of raw material deliveries for a dairy processing company has been studied, involving a decision-making module to ensure 95% confidence in meeting the quality criteria for the deliveries. The research presents a new method for predicting the controllability of the measurement process in a microbiological laboratory using a cumulative sum control chart for the En criterion and the stepwise approximation method. In this area, the candidate has published her research in publications G8-1, 2, 4, 7, 8, 20, and 21.

• **Yeasts - Vitality and Viability**

The lifting power of baker's yeast has been measured and compared at different concentrations and fermentation temperatures of the dough. The research provides a solution to issues related to ensuring the quality of baker's yeast and, consequently, the production of bread. An innovative study presents an automated image-based cytometric method for determining the total number and viability of yeast cells using the newly synthesized DNA fluorescent dye PO-TEDM-1 and the new tool Easycounter YC. The synthesized polycationic asymmetric monomethine cyanine dye PO-TEDM-1 penetrates only dead cells, and the new fluorescent dye has high sensitivity to nucleic acids and fast interaction kinetics. The proposed method can be used in analyses that involve simple cell counting and quality assurance in the bio-processing of samples. In this area, the candidate has published her research in publications G8-9, 10, and G 7-4.

• **Application of Molds and Yeasts for the Production of Valuable Bioproducts**

Another key area of the candidate's work is the reduction of carbon dioxide emissions, both through the life cycle of non-food raw materials for biofuels and new strains of microorganisms, as well as through the global application of technologies for capturing major sources of greenhouse gas emissions (G8-11).

The possibilities for cultivating and developing two types of microorganisms, *Aspergillus oryzae* and *Saccharomyces cerevisiae*, on coffee grounds with the aim of utilizing coffee waste have been investigated. The analyses show that coffee grounds can successfully be used as part of the growth medium for *Aspergillus oryzae* and even independently as a medium. No significant difference was found in enzyme activity on the two types of media. (G7-5). The data confirm that microorganisms are capable of absorbing coffee waste and converting it into useful organic products (G7-6).



Research has also been conducted on the production of citric acid from *Aspergillus niger* using coffee grounds from vending machines, bulk coffee, and espresso capsules. The growth of selected bacteria, yeasts, and fungi on coffee grounds obtained through brewing, espresso coffee, and capsules has been determined. The results show that fungi, particularly *A. niger* and *A. oryzae*, can grow on coffee grounds, regardless of the method of extraction. It was also found that fungi grow vigorously on brewed coffee, espresso coffee, and coffee capsules. These studies demonstrate the potential for using coffee grounds as a nutrient medium for microorganism growth and the high resilience of fungi to coffee and coffee grounds. (G8, 11-13, 16, 19).

I would add that all the presented research also contributes to the accumulation, supplementation, and enrichment of knowledge in the scientific field of the competition. I definitely believe that the scientific results presented by Dr. Yordanova are the result of many years of continuous effort and hard work, as well as excellent knowledge, which form the foundation of her development as a scholar and researcher.

3. Opinions, Recommendations, and Remarks

In the presented scientific works for participation in the competition, I have not found any serious weaknesses that would affect my final assessment. I express my positive conviction regarding the scientific value of Dr. Yordanova's entire publication activity and engagement. Her determination and activity in growing as a teacher and researcher are evident, as well as her expressed scientific interests and specialized expertise in the field of biotechnology. I consider her to be a highly organized and reliable researcher, capable of handling tasks from various scientific areas. I find it appropriate that the accumulated experience and scientific potential should be directed toward more active publication in prominent international publishers and journals with impact factors, which would bring her increased citation rates. Awarding the title of "Associate Professor" would expand Dr. Yordanova's opportunities as a scientist in collaborative work with specialists and experts from other institutes and universities.

4. Conclusion

In accordance with the above, I would like to clearly state that the candidate in the competition, Chief Assistant Professor Dr. Galina Dimitrova Yordanova, meets the requirements set forth in the Regulations for the Conditions and Procedures for Acquiring Scientific Degrees and Holding Academic Positions at the University "Prof. Dr. Asen Zlatarov" - Burgas. After reviewing the presented competition materials and scientific publications, analyzing their relevance, significance, and contributory elements, I have grounds to recommend that the esteemed members of the Scientific Jury vote positively and propose to the Faculty Council of the Faculty of Technical Sciences to select Chief Assistant Professor Dr. Galina Dimitrova Yordanova for the academic position of "Associate Professor" in the scientific field 5. Technical Sciences, Professional field 5.11. Biotechnology, Scientific specialty "Technology of biologically active substances (including enzymes, hormones, proteins)."

Date: 17.12.2024

The report was written by:
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