

## REVIEW

on competition for the occupation of an academic position "Associate Professor" from the field of higher education 5. Technical sciences, professional direction 5.11. Biotechnologies, scientific specialty "Technology of biologically active (incl. enzymes, hormones, proteins)", announced SG No. 70 of 20.08.2024, for the needs of the department "Biotechnology" at the Faculty of Technical Sciences, University "Prof. Dr. Asen Zlatarov"

**with a candidate:** assistant professor dr. Eng. Galina Dimitrova Yordanova

**Reviewer:** Assoc. prof. Yavor Ivanov

**University "prof. dr. A. Zlatarov"-Burgas.**

### 1. General and biographical data:

The current competition for "associate professor" is announced for the needs of the Department of Biotechnology at the University "Prof. Dr. Asen Zlatarov", published in the State Gazette No. 70 of 20.08.2024. For the competition, Senior Assistant Professor Dr. Galina Dimitrova Yordanova is the only candidate. In 2000, Galina Yordanova graduated with a Master's degree, Master's program "Biotechnology" at the University "Prof. Dr. Asen Zlatarov" - Burgas. In the period 2006 - 2007, she was a part-time assistant at the same university. From 2007 to 2014, she was appointed as an assistant at the Department of Biotechnology, and in 2013 she acquired the scientific and educational degree "doctor" in the scientific specialty 02.11.11 "Technology of biologically active substances" at the University "Prof. Dr. Asen Zlatarov" – Burgas. The topic of the dissertation thesis is "Biodegradation of phenol and phenol derivatives with immobilized microbial cells". In 2016, she received the academic position of "chief assistant" in professional direction 4.3. "Biological Sciences". In total, Dr. Yordanova's work experience at this university is 18 years.

### 2. General description of the presented materials.

The scientific research and applied research activities of Senior Asst. Prof. Dr. Galina Yordanova are represented by:

- Monograph "B.3", published in 2022, COBISS.BG. The monograph is entitled "Methods for improving quality in organizations in the chemical and biotechnology industry". Its volume is 224 pages and is co-authored with Assoc. Prof. Dr. Dobromir Yordanova. There is a declaration from the co-author that Senior Asst. Prof. Dr. Galina Yordanova has 70% participation in the monographic work.

According to this indicator, the candidate has 100 points out of 100 required according to the minimum criteria of the ZRASRB for the academic position of "associate professor".

- 28 publications under indicator "G", of which: 7 are in refereed and indexed publications in world-renowned databases Web of Science and Scopus (indicator "G.7"); and 21 are in non-refereed but peer-reviewed publications (indicator "G.8").

Dr. Yordanova is in first place in 14 of the publications, in 10 she is in second place. All publications can be related to the professional field to which she is applying.

According to this indicator "G", the candidate has 309.03 points out of the required 200 points, according to the minimum criteria of the ZRASRB for the academic position "associate professor" and 300, required according to the Regulations on the conditions for acquiring scientific degrees and occupying academic positions at the University "Prof. Dr. Asen Zlatarov" - Burgas.

- according to indicator "D", 15 citations are presented which are in publications published in journals, referred and indexed in the world-famous databases Scopus and Web of Science. According to this indicator, senior asst. Dr. Yordanova has 150 points with 50 required according to the Law on the State Administration of Higher Education and Research and 100 points according to the Regulations on the Conditions for Acquiring Scientific Degrees and Holding Academic Positions at the University "Prof. Dr. Asen Zlatarov" - Burgas;

- For indicator "E", according to the Regulations on the Conditions for Acquiring Scientific Degrees and Holding Academic Positions at the University "Prof. Dr. Asen Zlatarov" - Burgas, 100 points are required. They are formed on the basis of the submitted references, as follows: certificate of participation in a project under the OP "Innovation and Competitiveness" contract No. BG 16RFOP002-1.005-0031 (20 points); certificate of participation in project No. BG05M2OP001-2.02-0001 "Student Internships" - Phase I (10 points); certificate of participation in project No. BG05M2OP001-2.013-0001 "Student Practices" - Phase II (10 points); 1 published application for an invention in issue 5/31.05.2016 in the Official Monthly Edition of the Patent Office, Sofia, 2016 (20 points); 1 book (notes) with the title "Food Legislation and Food Policy", ISBN 978-619-273-033-8, UDC614.31, available through the free catalog COBISS.BG-ID 67163144 (40 points); list of participation in 14 scientific intra-university projects, of which she is a project manager in 2. By indicator E, the candidate has 100 points out of the required 100, according to the Regulations on the conditions for acquiring scientific degrees and holding academic positions at the University "Prof. Dr. Asen Zlatarov" – Burgas.

The articles submitted in this competition are not repeated in previous competitions and no plagiarism has been established. The submitted documents and materials fully meet the requirements of the Law on the Bulgarian Academy of Sciences and Arts for the academic position of "associate professor" and the Regulations on the conditions for acquiring scientific degrees and occupying academic positions at the University "Prof. Dr. Asen Zlatarov" - Burgas.

The total number of points for all indicators is 699.03 points, which exceeds the minimum requirements of the Law on the Bulgarian Academy of Sciences and Arts for the academic position of "associate professor" - with a required total number of points of 400 and also exceeds the minimum requirements of the Regulations on the conditions for acquiring scientific degrees and occupying academic positions at the University "Prof. Dr. Asen Zlatarov" - Burgas, according to which 650 points are required.

### **3. General characteristics of the scientific research and applied scientific activity.**

The scientific research and applied scientific activity of Assistant Professor Dr. Galina Yordanova is in the professional field of "Biotechnology" and the scientific specialty "Technology of biologically active substances (incl. enzymes, hormones, proteins)".

The candidate's presented scientific works are as follows:

- Monography "Methods for improving quality in organizations of the chemical and biotechnology industry". Issues are considered for: improving quality and decision-making at the organizational and laboratory level; developing and implementing procedures for incoming control of raw materials and materials in enterprises of the chemical and biotechnology industry; procedures and algorithms for internal and external quality control in testing and medical

laboratories; developing a procedure for incoming control of raw materials and materials; for studying the process and eliminating non-conformities; as well as for outgoing control of finished products in organizations, etc.

➤ book (textbook - notes) - 1, which is entitled "Food Legislation and Food Policy". The notes are intended for students of the specialty "Food, Nutrition, Dietetics" for the educational qualification degree "Master" at the University "Prof. Dr. Asen Zlatarov" - Burgas. Asst.prof. Dr. Galina Yordanova has been teaching this discipline since 2018 and has gained a lot of knowledge and experience in this topic. The notes are consistent with the curriculum of the specific discipline "Food Legislation", but can be used by other studied disciplines of the specialty "Food Biotechnologies", Bachelor's Degree in Food Science and Analysis and Control, Master's Degree in Food Science and Analysis at the University. The notes can also be used by students of other specialties and professional fields, from other Universities. The notes examine in great detail the documents of the EU and Bulgarian food legislation in the field of food. Considerable attention has been paid to the nutritional situation in the country and the measures the country is taking to improve it;

➤ In the 28 scientific publications presented, several directions are outlined:

1. Biodegradation of phenol and phenol derivatives with immobilized microbial cells on various carriers.

In this direction, three publications (G 7-1, G 7-2, G 7-3) were presented. Cells of *Aspergillus awamori* NRRL3112 and *Trichosporon cutaneum* R57 were used. Polyamide and polyacrylonitrile membranes and modified polyamide granules were applied as immobilization carriers. A very good degree of biodegradation of phenol was achieved when using the bioreactor specially made by the authors with a spirally wound membrane with an immobilized strain *Aspergillus awamori* NRRL 3112 in recirculation mode (G7-2). Very valuable results were obtained with the combined use of the two immobilized systems of *Aspergillus awamori* NRRL3112 and *Trichosporon cutaneum* R57 on modified polyamide granules (G 7-3). A comparison of the biodegradation rate of phenol and some phenol derivatives by the combined immobilized system was made and its advantages were proven compared to the separate immobilized systems of the two strains and free cells.

2. Studying the viability and viability of the yeast *Saccharomyces cerevisiae* in the production of various bioproducts using a fluorescence counter  
In publications (G8-9, G 7-4 and G- 8-10) the viability of the yeast *Saccharomyces cerevisiae* was studied on a fluorescent counter, produced by the Bulgarian company Milkotronic and has become established on the international market. The study of this parameter is very important, since the course of a given biotechnological process depends on the viability of the cells. In publication (G 8-9) the lifting force of baker's yeast during dough fermentation was measured and compared with varying yeast concentration and temperature. The effect of freezing and thawing of fresh yeast from baker's yeast *Saccharomyces cerevisiae* on the number of live cells was studied. It has been proven that as a result of prolonged freezing and thawing, a decrease in the vitality and viability of baker's yeast is

observed (G8-10). A newly synthesized DNA fluorescent dye was used to count live and dead cells with the fluorescent counter. It was found that the newly synthesized dye fully corresponds to the widely used fluorescent DNA dyes and was successfully applied for counting live and dead cells in the beer production process (G 7-4).

3. Study of the growth of some molds and yeasts for obtaining valuable bioproducts:

The possibilities for cultivation and development of two types of microorganisms *Aspergillus oryzae* and *Saccharomyces cerevisiae* on coffee grounds were studied, with the aim of utilizing coffee waste (G8-12). The optimal conditions for the development of the *Aspergillus oryzae* strain on coffee grounds obtained from a vending machine were determined - 24 hours at 30 °C (G8-13). A comparison was made of the independent use of the waste coffee grounds as a nutrient medium and as an application and as part of the growth nutrient medium. No significant difference was found between the two types of nutrient medium (G7-5). The growth of selected bacteria, yeasts and fungi was determined on coffee grounds obtained by brewing, from espresso coffee and from capsules. The results obtained show that the growth of fungi is the greatest (G8-19). The possibility of producing bioethanol based on coffee grounds and *Aspergillus oryzae* cells (G 7-6) and of citric acid based on coffee grounds from a vending machine in bulk and from espresso capsules and *Aspergillus niger* cells (G 7-7) has been investigated. Publications G 8-11 and G 8-16 address the issues of using different types of biomasses, including microalgae and cyanobacteria, for the production of biofuels.

4. Quality control and management in various food production and laboratories

7 publications are presented in this area. Various issues in the field of quality control and management of food production and analysis are considered. Corrective actions have been developed in a laboratory for testing milk and dairy products (G 8-1), an algorithm has been developed for analyzing the causes of a decline in the production of meat and meat products in a given company (G 8-2), a study has been conducted to improve the methodology and increase the competitiveness of a beer production company (G 8-4), a procedure has been proposed for compiling an uncertainty budget for the initial verification of a standardized test method or validation of an interlaboratory method, by using two certified reference materials in the lower and upper limits of the measurement range of the respective method (G8-7); studies have been carried out for the detection of *Salmonella* species in connection with the requirements of BDS EN ISO/17025 and BAS QR 18 to ensure the authenticity of the results (G8-8); A new solution for incoming control of raw material supplies for a dairy company was studied (G8-20); a new method for predicting the controllability of the measurement process in a microbiology laboratory was presented (G8-21).

Assist. Prof. Dr. Galina Yordanova participates in 14 research intra-university projects), of which she is a project manager in 2. She also

participates in three national scientific and educational projects and has 1 published application for invention.

From the general description of the scientific and research and applied scientific activities of Assist. Prof. Yordanova, it is obvious that the scientific publications are entirely in the professional field of Biotechnology, scientific specialty "Technology of biologically active substances (incl. enzymes, hormones, proteins)" and fully correspond to the direction of the announced competition.

#### **4. Assessment of the candidate's pedagogical training and activities.**

Assistant Professor Dr. Galina Yordanova has extensive lecturing experience. Her pedagogical training meets the requirements for holding the academic position of "associate professor". Over the past three years she has:

- given lectures and exercises with students in the Bachelor's and Master's programs in the Biotechnology and Food Biotechnology majors at the University "Prof. Dr. Assen Zlatarov" in the following disciplines: Microbiology; Biotechnological production; Biotechnology of pharmaceutical and agrobiological agents; Technology of milk and dairy products; Preservation; Food legislation and food policy; Quality management of food products.
- Developed and updated 13 curricula: 6 for Bachelor's and 7 for Master's degree programs;
- Supervisor of 10 graduates in the Biotechnology major;
- Member of the General Assembly of the University of Agricultural Sciences and the Faculty Council of the Faculty of Technical Sciences from 2022 to present;
- Member of the committee for conducting the State Examination for the Bachelor's Degree in Biotechnology and Food Biotechnology;
- Member of the committee for conducting the Biology Examination for the Master's Degree in Medicine.

#### **5. Main scientific and applied scientific and applied contributions.**

The contributions from the research activities of Assist.prof. Galina Yordanova can be classified as scientific and applied scientific.

Main scientific contributions

1. New independent and combined immobilized systems based on *Aspergillus awamori* NRRL3112 and *Trichosporon cutaneum* R57 cells on polyamide and polyacrylonitrile membranes and on polyamide granules for the purpose of phenol biodegradation have been created.
2. A new fluorescent dye has been synthesized and its application for counting live and dead cells has been proven, allowing for the demonstration of cell viability for the effective conduct of biotechnological processes and strict analysis of the quality of some food products.
3. The monograph, "Methods for improving quality in organizations of the chemical and biotechnology industry" is a new scientific product developed on methods for improving quality in industrial enterprises of the chemical and biotechnology industry, which include procedures and algorithms for the various processes in organizations.

## Main scientific and applied contributions

1. The degree of biodegradation of phenol and phenol derivatives has been determined using immobilized systems of *Aspergillus awamori* NRRL3112 and *Trichosporon cutaneum* R57 on polyamide and polyacrylonitrile membranes and polyamide granules.
2. The advantages of the combined immobilized system of *Aspergillus awamori* NRRL3112 and *Trichosporon cutaneum* R57 for biodegradation of phenol and phenolic derivatives have been proven in comparison with the separate immobilized systems of the two strains and free cells.
3. The vitality and viability of the yeast *Saccharomyces cerevisiae* in the production of bread and beer have been studied using a fluorescence counter.
4. The possibility of using waste coffee grounds as an added or independent nutrient medium for the *Saccharomyces cerevisiae* and *Aspergillus oryzae* strains has been proven.
5. It has been established that the *Aspergillus oryzae* strain is able to digest coffee waste and convert it into bioethanol.
6. A number of corrective actions have been determined in some food production facilities and laboratories that should be applied when there are discrepancies in the testing policy and procedures of the quality control and management system.

## 6. Significance of contributions to science and practice

The contributions from the work of Assist. prof. Dr. Galina Yordanova are of a scientific and scientifically applied nature. The presented citations prove the significance of the achieved scientific results. A total of 15 citations were noted, but unfortunately, they are only for two publications referenced in Scopus. The scientific contributions show that the scientific competence of Assist. Dr. Galina Yordanova is specifically in the field of Biotechnology, i.e. completely in the announced direction of the competition.

## 7. Critical remarks and recommendations

I have no critical remarks about the content and manner of presentation of the documents in the competition. I have one recommendation, which is related to her publication activity, namely, in order for her developments to receive greater public importance and to receive more citations, it is necessary for the articles to be published in refereed and indexed editions in world-famous databases Web of Science and Scopus.

## 8. Personal impressions and opinion of the reviewer.

I know Assist. prof. Dr. Galina Yordanova for many years, as we work in the same department and I have observations of her research potential and her lecturing skills. And I can confidently state that she makes efforts in both roles, devotes her energy and time to both the development of the department and makes efforts to attract students and create lasting interests in them in the PN 5.11.

23.12.24

reviewer: assoc. prof. Y. Ivanov.