TRAKIA UNIVERSITY, AGRARIAN FACULTY

R E V I E W

From: Ivan Tanev Ivanov, Professor, Doctor of Sciences (Biophysics), scientific specialty Physics, Trakia University, retired.

Subject: competition for a professor in the scientific specialty of Physics, professional direction 4.1 Physical sciences, field of higher education 4. Natural sciences, mathematics and informatics in Agrarian faculty of Trakia University

1. General information about the competition:

The competition was announced for the needs of the Department of Biochemistry, Microbiology and Physics, Agrarian Faculty of Trakia University of Stara Zagora, published in the Bulgarian “State journal” no. 93 / 03.11.2020.

I participate in the Scientific jury of the competition according to the Order № 88 / 15.01.2021 of the Rector of the Trakia University of Stara Zagora.

As a member of the Scientific Jury, I declare that I have no "private interest" within the meaning of § 1, item 3 of the Additional Provisions of the Law for development of the academic staff in the Republic of Bulgaria. Within the meaning of § 1, item 5 of the Additional provisions of the Law for development of the academic staff in the Republic of Bulgaria I am not a "related person" with the participants in competition; I have no interest in benefiting; I am not in a relationship that casts doubt on my impartiality.

2. Information about the candidates in the competition.

Stefka Lyubova Atanasova, PhD, Associate Professor in the "Physics" section of the Department of Biochemistry, Microbiology and Physics of Agrarian Faculty, Trakia University of Stara Zagora is the only participant which submitted his documents for participation in the competition.

In 1975 Assoc. Prof. Atanasova graduated from the Nikola Obreshkov Mathematical High School in Kazanluk, specializing in mathematics. In the same year she entered Plovdiv University "Paisiy Hilendarski" and graduated in 1979 with a master's degree in Physics. In the years 1979-1982 she worked as a teacher in Physics at the Russian language High School in Rouse city, Bulgaria. From 1982 to 1986 she worked as an Assistant Professor in Physics

at the Department of Physics and Mathematics of the Higher Institute of Zootechnics and Veterinary Medicine, which is recently a part of the Trakia University of Stara Zagora. Her next career developed in the same Department to our days. In September 1983 he completed a postgraduate course in "Molecular Spectroscopy" at the Faculty of Physics of Sofia State University "St. Kliment Ohridsky", which turned out to be decisive for the topic of her future scientific work. In the years 1986-1990 she was a Senior Assistant, and in 1991 she was elected as Chief Assistant. In the following year of 1992 she defended his dissertation on "Application of spectral analysis in the near infrared region to determine the nutritional value of bulk feed". In the year of 2008 she specialized in the Institute of Science, Bangalore, India, and in 2012 in NOFIMA, Ås Municipality, Norway. In the years 1997-1998 she conducted a 12-month specialization in the Kobe University, Agricultural Faculty, Japan. The topic of her specialization was "Spectral analysis in the near infrared region". In the year of 1999 she was elected Associate Professor. She has been a guest lecturer at Tsukuba University, Tsukuba, Japan; she lectured at the Indian Institute of Science, Department of Instrumentation, Bangalore, India; Indian Institute of Technology, Kanpur, India; Kwansei Gakuin University, Sanda, Japan; Kobe University, Kobe, Japan; University of Udine, Italy and in Uludağ University, Bursa, Turkey.

2. Fulfillment of the requirements for acquisition the academic position "professor" according to the Regulations for the development of the academic staff at the Trakia University of Stara Zagora and its Appendix 8.1 for the Agrarian Faculty of Trakia University of Stara Zagora.

Assoc. Prof. S. Atanasova has presented a table prepared according to this appendix, which shows that it covers all groups of minimum national and additional quantitative requirements for scientific and academic activities required for the acquisition of the academic position "professor" in the specified scientific and professional field.

For example, from the group A of indicators she receives the required 50 points for her doctoral dissertation, and from the group B (item 3) of indicators she receives 102 points, whereat 100 points are necessary, on the basis of a list of publications equivalent to a habilitation thesis. The list includes a total of six publications, which are referenced and indexed in the Web of Science and Scopus databases with the corresponding impact factor and/or impact rank.

From the group C (item 3) of indicators it receives 206 points (whereat 200 are necessary), presenting a list of 12 other publications, which are referenced and indexed in the databases of Web of Science and Scopus with the respective impact factor and/or impact rank.

According to the group D of indicators a total of 100 points, equivalent to 50 citations of author's scientific papers, are needed. Exactly the same number of points she obtained from a paper, published in 1999, and its 50 citations presented. In fact, this article has been cited totally 133 times.

For the group E of indicators a total of 150 points are needed, while 260 points are obtained. They are accumulated from the participation in a significant number of projects (170 points), the writing of a university textbook (40 points), as well as from the scientific guidance of a doctoral student (50 points). The doctoral defense was led by two supervisors from different scientific fields.

In conclusion, with regard to point 2 it can be indicated that the minimum national requirements for all groups of indicators in Table 8.1 are met.

3. Evaluation of the academic activity

Assoc. Prof. Atanasova has 3 years of teaching experience as a teacher in Physics, 16 years as an Assistant Professor, Senior and Chief Assistant Professor and 11 years as an Associate Professor, which far exceeds the required teaching experience for the academic position of a professor.

She independently published a textbook in Physics with basics of Biophysics, which is available in electronic form to students. She participates in an author's collective from the Department for the thrice issuing the Manual for laboratory exercises in Physics with basics of Biophysics, respectively in 1995, 2000 and 2009. In addition she has prepared the electronic courses in English entitled "Methods for distant analysis" and "Physics with the basics of biophysics" for students with the specialty in Veterinary Medicine.

She has independently developed the curricula of five disciplines for the students of the Agrarian Faculty of the Trakia University of Stara Zagora: "Biophysics and biophysical methods of purification"; "Physics first and second parts"; "Methods for distant analysis"; "Non-destructive methods for analysis of soils and plant products" and "Physical and chemical methods for analysis of agricultural products".

Her main teaching courses (lectures and exercises) are "Physics with Fundamentals of Biophysics" in Bulgarian and English for students of Veterinary medicine and "Physics first and second parts" for students of Agricultural Engineering. She additionally lectured six more disciplines: "Biophysics and biophysical methods for purification"; "Fundamentals of Biophysics"; "Methods for distant analysis" (in Bulgarian and English); "Non-destructive methods for analysis of soils and plant products" (in Bulgarian and English); "Physical and chemical methods for analysis of agricultural products"; "Wind and solar energy" for

students studying in "Ecology", "Veterinary Medicine", "Zooengineering", "Agricultural Engineering" and "Agronomy".

She was a scientific supervisor of one doctoral student and of 12 diploma theses with successful defenses, 9 for bachelors and 3 for masters.

She has been a member of the methodical council for the specialties of Ecology and Agricultural Engineering.

Based on the above data, the candidate can be given a very high assessment mark concerning its teaching experience and degree of readiness for the academic position of Professor in Physics. The competition has been announced in a scientific specialty that corresponds to the previous teaching activity of the candidate.

4. General characteristics of the presented scientific publications

4.1. ***Main directions in the research activity.***

A total of 18 articles in full text in English, published in Bulgarian and international journals after habilitation, were presented for the competition. The scientometric indicators of the journals are presented in the following table:

№ of the publication	SJR (SCImago journal rang)	Category (Q) of the journal	Impact factor (IF) of the journal
1	0.191	Q3	-
2	0.142	Q4	-
3	0.637	Q2	1.638
4	0.191	Q3	-
5	0.191	Q3	-
6	1.341	Q1	3.998
7	1.055	Q1	1.674
8	0.876	Q1	1.715
9	0.869	Q1	1.331
10	0.872	Q1	1.311
11	0.525	Q3	0.851
12	0.108	Q4	-
13	0.197	Q3	-
14	0.142	Q4	-
15	0.142	Q4	-
16	-	-	-
17	0.191	Q3	-
18	0.481	Q2	2.072

The Central Library of the Trakia University has provided an official reference list concerning the citations of the presented 18 articles and the impact factor and rank of the journals that published them. The presented quantitative indicators of most articles show a satisfactory average scientific level, while the publications with numbers 3, 6, 7, 8, 9 and 18 reach indicators characteristic of significant scientific achievements. The total impact factor of Assoc. Prof. Atanasova is 14.59. Out of 18 presented articles, Assoc. Prof. Atanasova is the first author in two articles, second in 9 articles, third in three articles, fourth or fifth in four articles.

4.2. *Main* ***scientific and / or scientific-applied results***.

The main results of the candidate were obtained during the scientific specializations abroad and as a leader and participant in several international, national and university projects. The latter include the projects named "Spectrometric studies in the near infrared range for determination of the composition and quality of agricultural products"; "Application of NIRS for rapid determination of microbial contamination in food products"; "Development of intelligent technologies for assessing the quality and safety of food agricultural products" and others. Under the project "Spectral analysis in the near infrared region - an alternative and fast method for determining the main soil indicators" several good articles have been published which are not presented in the competition.

The main scientific direction in the research activity of the candidate is the application of the method of absorption spectroscopy in the near infrared region to study the composition and quality of various organic products and foods - meat, fish, milk, wine. This is a proven method for fast and accurate analysis of the composition and quality of various food products in the food industry, animal husbandry and plant growing. The main advantages of the method are speed, absence of destructive action on the sample, possibilities for simultaneous control of several parameters and remote transmission and computer processing of the obtained data. The disadvantage of the method is its low sensitivity and specificity. Consequently, it is frequently necessary to differentiate the obtained spectrum on the wave length and to evaluate the obtained differences to the control sample using appropriate programs for statistical processing.

This main group includes 11 publications with no. 1, 2, 7, 8, 9, 10, 11, 12, 13, 17 and 18, which makes 61% of the total presented publications. Within this group several articles should be underlined based on their citation rate; articles no. 7 with 134 citations, no. 8 with 97 citations, no. 9 with 52 citations, no. 10 with 27 citations and no. 11 with 24 citations. The large amount of this type of scientific production and its high evaluation by the international scientific community demonstrates the high qualification and the significant contribution of

the candidate in this field of important economic importance. Shown is the practical significance of the method to estimate the freezing time of meat, to determine the antioxidant activity of different varieties of wine, the amount of useful components of milk and the presence of somatic and bacterial cells in it, to detect early molding on cucumber leaves and etc.

An important advantage of the candidate's scientific work is the usage of specialized programs for statistical data analysis. Used are the programs Statistica 6 for Windows; Pirouette 4.5 software (Infometrix, Woodinville, WA), programs for regression analysis, Tukey's test for comparison of mean values, etc.

Two articles, no. 6 and 7, could be distinguished as having high scientific significance. Using the above indicated method, the article no. 6 has examined the state of water in a plant (*Haberlea rhodopensis*) capable of recovering after a long period of drought. Compared to other plants, this plant has been shown to use different strategy to store water in extremely dry conditions, releasing free water and keeping back the water molecules which are bound by hydrogen bonds. In the article no. 7 having the highest citation rate (133) the transmission absorption spectroscopy was applied to study the quality of non-homogenized milk. In the spectral range of 700 to 1100 nm, the best accuracy was achieved at a sample thickness of 10 mm for determination of butter and 1 mm for determination of total protein, while the accuracy for determination of lactose did not depend on the sample thickness. The additional processing of spectral data did not affect the accuracy of the determination of total protein and butter.

In four of the presented articles, those with no. 3, 4, 5, 6 and 17, Assoc. Prof. Atanasova applied different statistical methods for data processing. The objectives of these studies are different: to determine the stage of pregnancy in goats (№ 3), to determine the characteristics of the chromosomal composition of the plant *Henopodia* (duck leg) growing in Bulgaria (№ 4 and 5), to determine the antioxidant components and the total antioxidant activity of different grape varieties grown in Bulgaria (№ 17).

In two of the articles (no. 14 and 15) the absorption spectroscopy in the ultraviolet and visible region was used to study the aqueous extracts of cocoons of different colors. The optimal conditions for extracting the protein sericin as well as additional bioactive substances have been established. The absorption spectrum and antioxidant activity of these extracts have been determined as a function of the color of cocoons. A strong correlation between the antioxidant activity of aqueous extracts and near infrared spectrum of light reflected by the cocoon surface has been found.

5. Evaluation of scientific and practical research contributions

The presented publications show significant scientific and practical contributions in the field of controlling the composition and quality of food products. They confirm the prospects of using absorption spectroscopy in the infrared region for this aim. This is evidenced by the facts that five articles with numbers from 7 to 11, included in this section, have been published in journals with a high impact factor and have received a total of 334 citations. High marks can also be given to the results obtained by the same physical method and included in article no. 6 published very recently. These results indicate a completely new molecular mechanism by which some plants successfully overcome drought conditions.

6. Critical remarks and recommendations

I have no critical remarks or recommendations. I believe that it is necessary to emphasize the ability of Assoc. Prof. Stefka Atanasova to work in a team incorporating her qualification and results in order to achieve the common goal.

7. Conclusion

The rich and continuous teaching experience, the quantity and quality of the exhibited scientific and research publications, the international relationship and recognition are proof that candidate meets the requirements for the academic position "professor" according to the Regulations for the development of the academic staff at the Trakia University of Stara Zagora and its Appendix 8.1 for the Agrarian Faculty of this university. Based on the presented evidence regarding the teaching, scientific and practical research of Assoc. Prof. Stefka Atanasova, I recommend the esteemed scientific jury to award her the academic position of "professor".

Date / place Signature: …….....

(Professor Ivan T. Ivanov, PhD, DSc)

February 21, 2021

Stara Zagora, Bulgaria