

## OPINION

by Prof. Dr. Andon Vassilev Andonov, Faculty of Agronomy,  
Agricultural University - Plovdiv,  
on materials submitted for participation in a competition,  
announced in SG, 32/16.04.2021,  
for the academic position of "Associate Professor" in a professional field  
4.3. Biological Sciences (Biophysics)  
in the Department of Biophysics and Radiobiology, Faculty of Biology, Sofia University  
"St. Kl. Ohridski"

Assistant Professor Dr. Margarita Angelova Kuzmanova from the Department of Biophysics and Radiobiology, Faculty of Biology, Sofia University "St. Kliment Ohridski" is the only candidate for the announced position.

Margarita Kouzmanova graduated in 1981 at the Faculty of Biology at Sofia University "St. Kl. Ohridski" with a Master degree and a qualification of teacher of Biology and Chemistry. She has worked in the Department of Biophysics and Radiobiology at the same Faculty as a Biologist since 1987. After successful defence of a doctoral dissertation (1997) and winning a competition for academic position, she was appointed as senior assistant (1999) and subsequently promoted to assistant professor (2002).

Dr. Margarita Kouzmanova participates in the competition with a complete set of documents, which are in accordance with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB), the Rules for implementation of LDASRB and the Rules of Sofia University "St. Kl. Ohridski".

Dr. Kuzmanova is a co-author of 31 scientific publications in peer-reviewed scientific journals and books and 20 scientific publications in proceedings of national and international scientific forums. She participates in this competition with 19 scientific publications in journals, which are referred and indexed in world databases with scientific information. Among publications, 12 have impact factor (IF) and 2 have SCImago Journal Rank (SJR). The publications are distributed along journals of different categories as follows: 7 articles in journals with category Q1, 2 in Q2, 2 in Q3, 1 in Q4, 2 in journals without quartiles for the year of publication, 4 chapters of books and 1 collective monograph.

The list of publications of Dr. Kouzmanova and their citations met and exceeded the minimal national requirements according to Art. 2b of ZRASRB. Four of the presented publications belong to the group of indicators B (category Q1; total 100 points), and the remaining 15 publications belong to the group of indicators D (total 252 points). These publications are results of the candidate's active participation in scientific projects funded by internal and external sources (NSF, COST, bilateral projects). At the time of submitting the documents, 344 citations were noticed, of which 286 in publications, indexed and referred in the Web of Science and Scopus.

The above mentioned publications of Dr. Margarita Kouzmanova are entirely in the scientific field of the competition - Biophysics, and these studies can be differentiated into two main areas.

The scientific work of the candidate in the area 1 (*Biological effects of magnetic and electromagnetic fields*) is focused on studying the effects of constant magnetic field (MP) and high-frequency low-intensity electromagnetic fields (EMF) on biological objects with different structural and functional level - individual cells or the whole organism. Positive effects from the application of each of the methods have been identified.

The static magnetic field of 5 mT modifies the binding properties of lectin in human erythrocytes (1, 2 and 3) and allows detection of changes in the glycoprotein complex of biomembranes. Exposure to millimeter waves (MMW) at frequencies used in medicine for therapy modifies the immune reactivity of rats by increasing the level of histamine and lowering the level of ceruloplasmin in their blood (4). Irradiation with GSM900 EMF stabilizes the membrane of human erythrocytes and leads to a decrease in hemolysis, the effect of which depends on a number of factors (5).

The main part of the research, presented in the competition of Dr. Margarita Kouzmanova, is summarized in area 2 (*Biophysics of photosynthesis*). In this area, the biophysical processes in the photosynthetic apparatus of higher plants, related to their response to various stressors, were thoroughly studied. The main objective of these studies is the characterization of the unique phenomenon "chlorophyll fluorescence (HF)". By measuring the parameters of HF (fast - FF, delayed - DF and modulated scattering of 820 nm light - MP) a new valuable information has been obtained, which revealed specific details of the effects of various factors on the photosynthetic process in the studied objects. Specifically, the effects of mineral deficiencies (10, 11, 14 and 17), high temperatures (18), electromagnetic fields (7), parasitic plants (16, 19) and others were studied.

A methodological contribution to the fluorescence research is the modification and enrichment with additional indicators of the well-known JIP-test of Prof. Strasser (Strasser and Strasser, 1995) and its applications. It has been shown, for example, that the monitoring of fluorescence signal drops may be an additional criterion for the *in vivo* quantification of the redox reactions of plastoquinones  $Q_A$  and  $Q_B$  (9).

Based on a complex fluorescent data, an artificial neural network, capable of recognizing relative water content (RWC) in the "unknown" plant samples with a high degree of correlation between the calculated and gravimetrically determined RWC values has been created. These results are a prerequisite for the development of a new method for *in situ* quantification of drought stress in crops (8).

I also highly appreciate the contribution of Dr. Kouzmanova as a co-author in the publication of the monograph (12), which summarizes her own experience and presents in an accessible form the theoretical bases and possibilities for application of the method of chlorophyll fluorescence in the agronomic practice.

The attached reference for the educational and pedagogical work shows a high commitment of the candidate to the teaching work in the Department of Biophysics and Radiobiology. She has developed 4 lecture courses, 3 of which in Biophysics for students of different specialities, and 14 practicals. She has supervised 6 successfully defended graduates as well as preparation of course assignments of 116 students. Up to 2016 she was secretary of the master's program Biophysics.

Dr. Margarita Kouzmanova is a good organizer of scientific events. Since 2012 she has been a regular member of the commission for organizing and conducting the annual

National Competition in Natural Sciences and Ecology, MES. She has also participated in the organizing committees of a number of scientific events, including the International School "Electromagnetic Fields and Biomembranes" (1989, Pleven), a scientific seminar with international participation "Stress responses of plants and selection of tolerant genotypes in major crops" 2010, Plovdiv) and others.

### CONCLUSION

The documents and materials submitted by Assistant-Professor Dr. Margarita Kouzmanova, fully comply with all necessary requirements in order to acquire the academic position of "Associate Professor", according to LDASRB, the Regulations for its implementation and the Regulations of Sofia University "St. Kl. Ohridski". The scientific works presented by her are completely related to the announced topic of the competition. The presented materials are focused on current scientific problems, are performed at a high professional level and contain significant scientific and scientific-applied contributions.

Based on the results achieved by the candidate in both scientific and educational work, I confidently give a positive evaluation of the activities of Assistant-Professor Dr. Margarita Kouzmanova. I recommend the Honored Scientific Jury and the Faculty Council of the Faculty of Biology to grant the academic position of "Associate Professor" in the professional field 4.3. Biological sciences and scientific specialty Biophysics to Assistant-Professor Dr. Margarita Angelova Kouzmanova.

Plovdiv  
22.07.2021

Member of the scientific jury:

  
/Prof. Dr Andon Vassilev Andonov/